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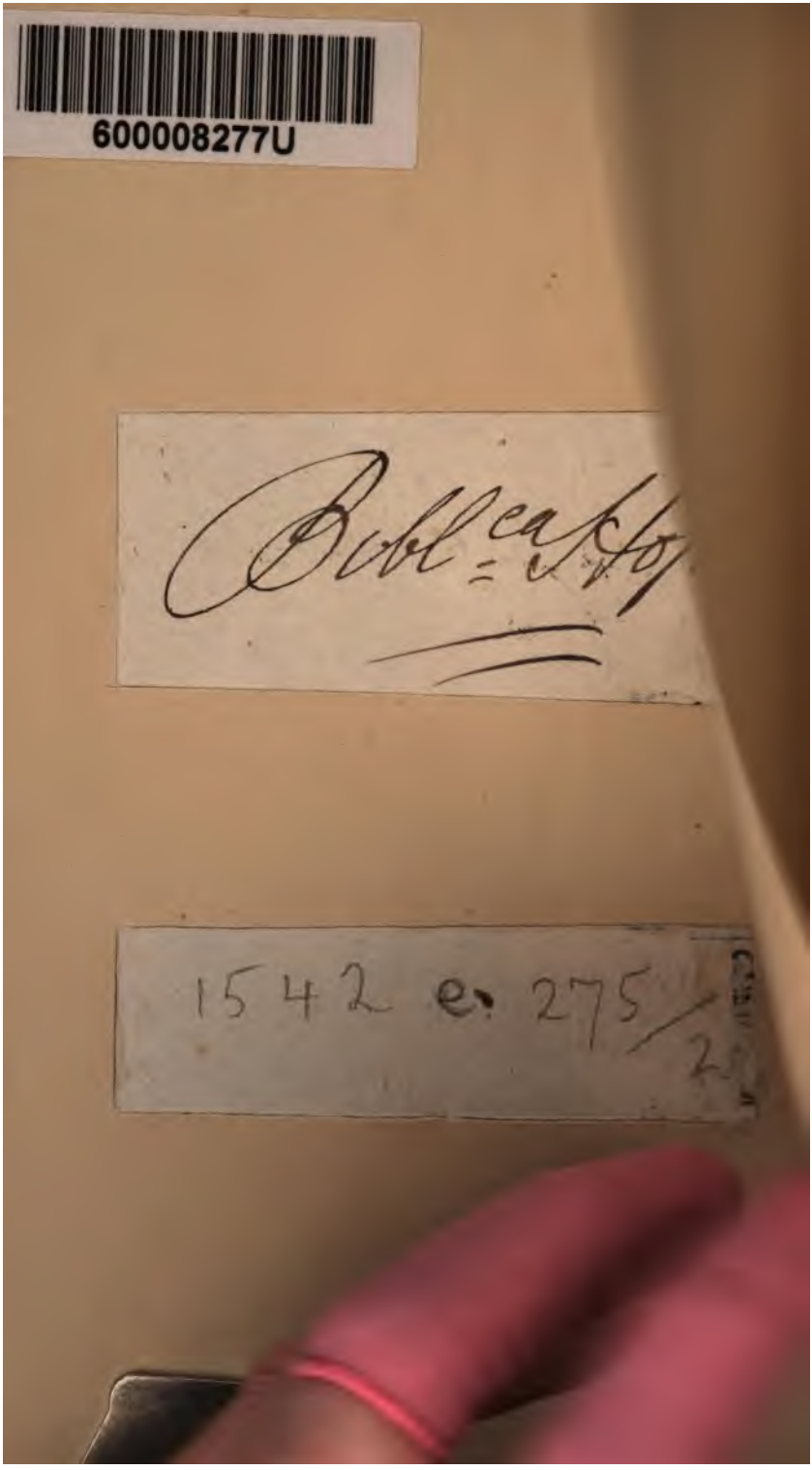
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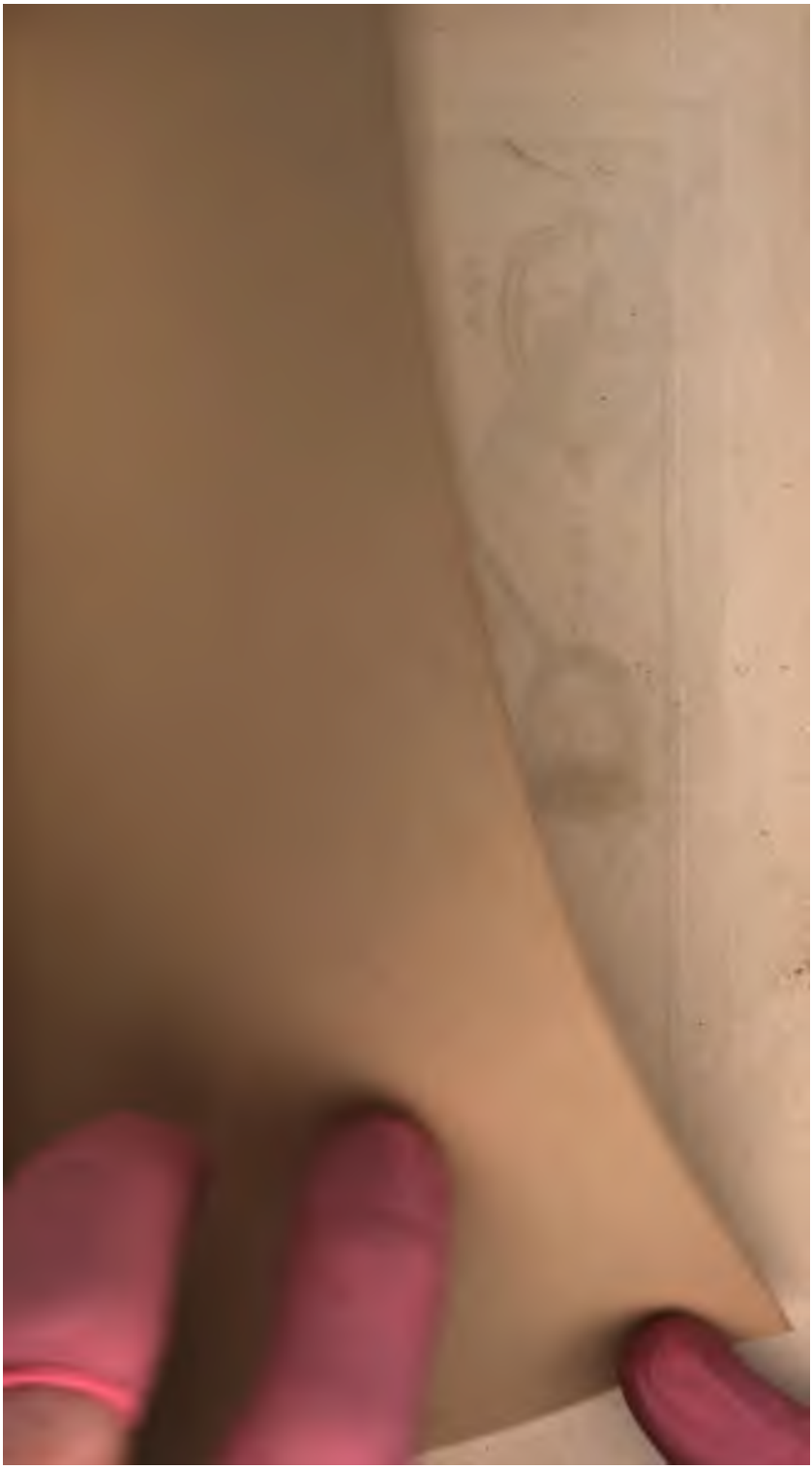

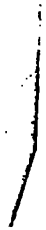

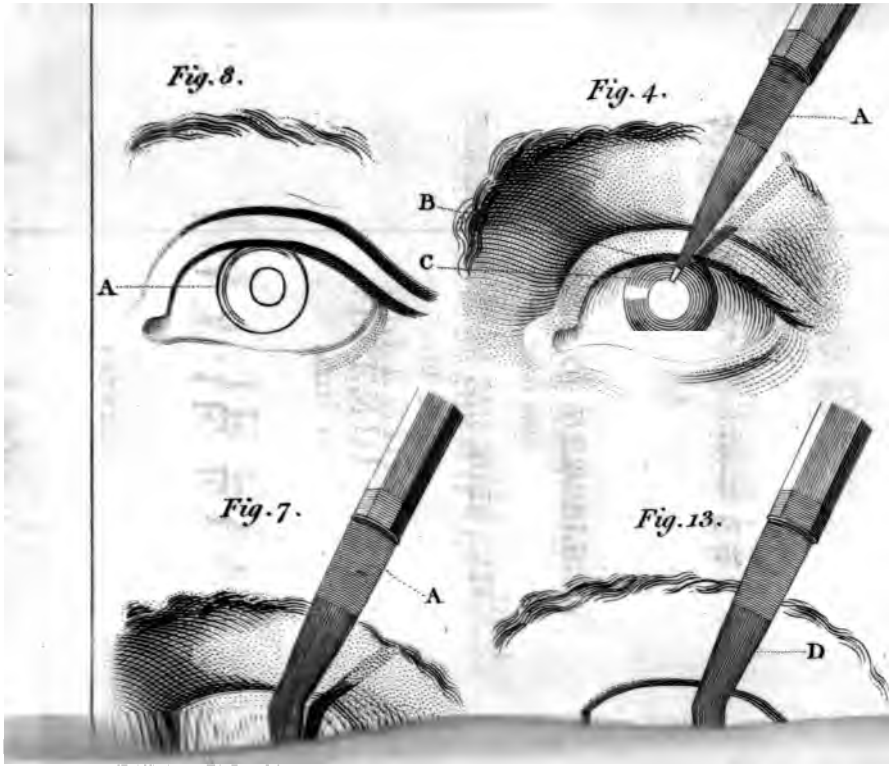
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Fig. 6.
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Chirurgical Observations

RELATIVE

TO THE EYE:

WITH AN

APPENDIX,

ON THE

INTRODUCTION OF THE MALE CATHETER;

AND THE

TREATMENT OF HÆMORRHOIDS.

BY

JAMES WARE, SURGEON, F.R.S. &c.

IN TWO VOLUMES.

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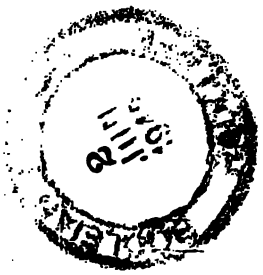

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PREFACE,

TO THIS VOLUME.

IN the following pages I have taken the liberty to bring together, in the same volume, a new Edition both of the Translation of the Baron de Wenzel's Treatise on the Cataract, and of my own Inquiries on this important subject.

It may not be improper, in this place, to remind the reader, that the Baron's Treatise did not proceed from the pen of the same Baron de Wenzel who, about twenty years ago, was justly celebrated in this city for his skill and success in extracting the cataract; but from that of his son. The work, however, avowedly contains the sentiments of the Author's

father; and it is written with so much judgment, as well as candour, that I am persuaded I shall not detract from the reputation, either of the father or the son, by presenting a new edition of it to the English reader. It is not to be supposed, however, that any two persons should so exactly agree in opinion, with regard to the various minutiæ of this disorder, and of the operation recommended for its cure, as not to have any difference in sentiment concerning them. I have thought it right, therefore, as I proceeded in the Translation, to point out those parts in which I could not coincide with the author; and I have added the reasons for my dissent at the bottom of the pages in which they occur. In a few instances I have also thought it advisable to render the Baron's descriptions a little more explicit than they appeared to me to be in the

original

original work. These additions, I hope, will not prove unacceptable.

In perusing the Treatise, the reader will perceive, that the Baron has confined himself almost entirely to a description of the mode in which the operation may be best performed in the various states of the disorder; and has rarely deviated from this line, either to mark the errors of former operators, or the accidents to which those are liable, who, adopting his father's plan, have not at the same time attained his father's dexterity. In the different departments of surgery, however, as well as in those of common life, it is of no small importance to be acquainted with the mistakes of others. Under this impression, I have for a long time accustomed myself to commit to writing every accident or mistake that has fallen within my observation, and has appeared to me worthy to be remembered;

bered; and having frequently found a review of these memoranda beneficial to myself in the branch of surgery which is now more particularly under the reader's notice, I hope I may have rendered some service to the faculty at large, by arranging them in a regular order, and offering them in their present form to the notice of the public. These memoranda, under the title of an "Inquiry "into the Causes which have most commonly prevented Success in the Operation of Extracting the Cataract; with "an Account of the Means by which they "may either be obviated or rectified," were first published in the year 1795; and they are now re-published with a few alterations and additions.

In the present volume I have added to the original Inquiry a compressed list of the memoranda it contains, under the title of Mementos; and these,

for many years, I have made it a constant rule to peruse, on the morning of every day in which I was engaged to perform the operation. To each Memento I have thought it adviseable to subjoin a brief exposition of its use and importance;—but as it may not be necessary to read the expositions so often as the mementos, the former are printed in a smaller type than the latter, that they may be perused, or passed by, at the will of the reader.

The third tract in this volume contains the Case of a young Gentleman who recovered his sight when seven years of age, after having been deprived of it by cataracts before he was a year old. This tract was read before the Royal Society of London, June 11th, 1801; and was published in the Philosophical Transactions of the same year. It contains a minute account of the observations

servations that were made by the patient when he first perceived objects, and a comparison of these observations with those that were made by a patient of the celebrated Cheselden under similar circumstances. It contains also a few remarks on the mode of operating in such cases; and the recommendation of a different operation where children have this disorder, from that which is usually preferred when it attacks persons who are further advanced in life.

The fourth tract is on the Dissipation of the Cataract. Instances of cures accomplished in this way have repeatedly come under my notice, when the disorder has been produced by an external cause; insomuch that I indulge a hope, that the operation, under such circumstances, may rarely, if ever, be necessary. The three cases which are described at length, under

this head, were published in the third volume of the Memoirs of the Medical Society of London. Of these, it is true, one only was produced by accident; but in the Notes, mention is made of many that were similar to it, in which the cataract was dissipated, and the sight restored, without any operation whatever. The two cases in which the cataract was produced without a known cause, and in which the sight was recovered without the aid of an operation, are the only instances of this kind of which I have obtained a satisfactory account. I am still unable to draw any practical inference from them, and they are related as extraordinary cases, the account of which, at some future period, I hope may lead to public use.

A great part of the fifth tract, on the Cure of the Gutta Serena, was also published

published in the third volume of the Memoirs of the Medical Society of London. What is now added consists of the ninth, tenth, eleventh, and twelfth cases. These serve to point out some varieties in the appearance and progress of the disorder, as well as in the treatment which is required to accomplish its cure.

New Bridge-Street,
June 18, 1804.

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A

TREATISE

ON THE

CATARACT.

SECT. I.

The Definition of a Cataract.

OF all chirurgical operations, none have been attended with more remarkable success, than that which restores sight to the blind, by taking away the opaque body, which intercepts the light in its passage to the immediate organ of vision. This malady, of which we find no mention in the writings of Hippocrates, is known by the name of Cataract. It shews itself as a speck or spot in the pupil of the eye, occupying sometimes the whole, and sometimes

SECT. II.

The Opinion of the Antients, with regard to the Seat of the Cataract.

THE antients, supposing that the eye could have no perception of objects without the crystalline humour, which they considered as the essential and immediate organ of sight[1], generally believed that the cataract was produced by a pellicle, formed before the crystalline, in the posterior chamber of the aqueous humour; and modern writers, supported by their authority, especially that of Galen[2], have eagerly defended

[1] Celsus, lib. vii. cap. 7, p. 432. in 12mo. Amstelod, 1687. Sub his gutta humoris est ovi albo similis; a qua videndi facultas proficiscitur; κρυσταλλοειδης a Græcis nominatur.

Galen de Usu Partium, lib. x. cap. 1. p. 529. edit. Charterii, Lutetiæ, 1679, in fol. tom. 4.

[2] See Oribasius Synops. lib. viii. cap. 47.

Ambrose Paré, lib. xviii. cap. 19. p. 456. Lyon. 1628.

Mery Mem. de l'Acad. des Sciences, 1707, p. 497. in 4to.

Woolhousius in Diario erudit. mensis Novemb. 1720, p. 568.

Hovius

defended the same opinion, until the beginning of the present century. About this time, some opaque crystallines, having been depressed with the needle, rose again, and, passing through the pupil into the anterior chamber[3], were thence extracted through an incision made for that purpose in the cornea[4]. These facts, supported as they are by repeated dissections, and by the operation of extracting the opaque crystalline, which has been practised in many thousand instances without any injury to the sight, have now fully set aside the erroneous opinion of the antients; and have satisfactorily proved that the cataract is solely owing to an opacity, either of the crystalline humour[5], or its capsule; and that the loss of sight

Hovius de Circul. Humorum in Ocul. Motu, 1740.

De la Hyre, junior, Mem. de l'Acad. des Scienc. 1707, p. 553.

[3] Brisseau appears to have been the first who gave the name of chambers to those parts which contain the aqueous humour.

[4] S. Ives, Malad. des Yeux, Paris, 1767, p. 237.—Mem. de l'Acad. des Sciences, anno 1708, p. 242.

[5] Lasnier Recherches sur la Chirurgie, p. 404.

Rolfincius

sight, in this disorder, is occasioned by the opaque humour intercepting the rays of light in their progress to the immediate organ of vision[6].

Rolfincius in Dissert. Norimb. 1656, lib. i. cap. 13. p. 179.

Gassendi Oper. Physic. tom. ii. p. 371.

Rohault Tract. Physic. tom. i. p. 416.

Marriotte nouvelles Decouvertes sur la Vuë, Paris, 1668.

Brisseau Traité de la Cataracte et du Glaucoma, Tournay, 1706.

Ant. Maitre Jean Malad. dex Yeux, in 12mo. p. 98, 1710.

[6] I have frequently seen the membrane of the aqueous humour (*a*) rendered opaque after an hypopion. This accident will be described in another place. It would tend to confuse the description of disorders of the eye, if the name of membranous cataract was given to such an opacity.

(*a*) The Translator has taken pains to ascertain the existence of this membrane of the aqueous humour, by dissecting a very considerable number of eyes of different animals; but he has, hitherto, been unable to discover it in any of them.

SECT.

SECT. III.

On the Causes of the Cataract.

THE causes of opacity in the crystalline humour are so various and uncertain, that I shall not dwell upon them, any more than upon the remedies that have been proposed for the prevention and removal of this disorder. I shall only remark, that persons who are much exposed to strong fires, as blacksmiths, locksmiths, glassmen, and those who are engaged in similar employments, seem to be more subject to it than others. In general, it first shews itself, by the appearance of threads, flies, cobwebs, black specks, bars, and other fantastic figures, dancing before the eyes. These are seldom accompanied with any pain, except it be an occasional slight sensation of weight in the ball of the eye, and about the forehead. When the cataract is produced by an internal cause, both eyes are almost always affected, the one after the other, in the same way. A blow,

or

or any other external act of violence, may excite the disorder in one eye only; but in this last case, the operation seldom restores sight to the patient, because other parts of the eye are, in general, injured by the accident, as well as the crystalline humour[7].

[7] The Translator is somewhat surprized that the author, in his list of the internal symptoms of the cataract, should omit to mention the appearance of a settled mist covering objects, and confusing those that are minute. In the instances of this disorder that have fallen within the Translator's observation, and especially in those which have been formed without any assignable external cause, this mist has almost always been perceived by the patient, before any opacity has been visible in the pupil. All the other symptoms, which the Baron describes, appear to the Translator to be more likely to proceed from extreme sensibility in the optic nerve, than from an incipient opacity in the crystalline humour.

SECT. IV.

On the Inefficacy of the Remedies usually employed in this Disorder.

THE principal external remedies that have been employed in the cure of the Cataract are, bleeding, cupping, scarifying, setons, issues, blisters, and fumigations; and the principal internal remedies are, aperients, incisives, emetics, cathartics, sudorifics, cephalics, and sternutatories. Preparations of eyebright, millepedes, wild poppy, henbane[8], and hemlock[9], have also been much commended as specifics for this disorder. There would be no end of enumerating the various remedies that have been proposed and administered under the same idea. Their number and variety are suf-

[8] Sauvage, Nosolog. Method. p. 724, Amsterdam, 1768.

[9] Anton. Stoerk libell. quo demonstratur cicutam, &c. Vindobon. 1760. Libell. cum Supplem. 1771. See an extract from it in the Journal de Medicine, 1760, June p. 503.—Journal de Medicine, tom. 24. p. 366. 1766, par M. Chemin.

ficient proofs of their inefficacy. It is nevertheless true, that many eminent physicians, antient and modern[1], have thought that incipient cataracts might be dissipated by internal remedies; and some have flattered themselves with the idea of having succeeded, not only in the commencement of the disease, but when the cataract was further advanced, and even when perfectly formed[2]. Scultetus[3] asserts, that he had checked its progress, by applying to the eye the gall of a pike, mixed with sugar; and Spigelius, as we are informed by the same author, boasted of having successfully used, for this purpose, the oil of the eel pout *(mustela fluviatilis)*. These assertions, however, and others of a similar nature, have been severely

[1] Celsus. lib. vii. cap. 7. N° 13. p. 431, 432. Amsterd. 1687.—Hilden. Epistol. 69.

Fabr. ab Aquapend. Oper. Chir. cap. de Suffus. Venetiis, 1619. p. 23.

Boerhaave de Morb. Ocul p. 119, 120. Paris, 1748.

Lemoine, Thèse aux Ecoles de Medicine, Paris, 1728.

Stoll. Ratio Medendi, tom. 3. 8vo. Vindob.

[2] Hovius, Tract. de Circul. Humor. in Ocul. Motu, p. 122, 1740.

[3] Armam. Chirurg. Declar. p. 127. an. 1672. Amstel.

censured

censured by men whose opinion is of great authority in the medical profession[4].

It has been said, that cataracts have been cured, in venereal patients, whilst they were under a course of mercurial medicines; but it is highly probable, that the complaints, so cured, were totally different from an opacity of the crystalline humour. It requires a more accurate acquaintance with disorders of the eye, than is generally supposed, to distinguish an incipient cataract from those extravasations of lymph, which occasionally are formed between the lamina of the cornea. These disorders, however, may readily be known from each other, by examining the eye side-ways; in which position, an opacity in the cornea will evidently appear to be situated anterior to the aperture of the pupil, and an opacity in the crystalline as evidently posterior to it. The reflection of the light from the cornea tends to mislead, in these cases, on taking a front view

[4] Heister. Instit. Chir. Amstel. in 4to. p. 564.

of

of the eye, and especially if the examination be superficial, and the patients complain of seeing mists in the air, or objects darting through it. Now it appears to me evident, that the disorder above mentioned, which gave way to the use of mercury, was nothing more than an extravasation of lymph in the substance of the cornea. And, as there is no well-authenticated case, which proves the success of any remedies in dissipating the cataract; and as, on the contrary, I have, in a great number of instances, had occasion to observe their total inefficacy, I think myself authorized in asserting, that internal remedies, either of the mercurial, or of any other kind, are inadequate to the cure of this disorder; and, equally so, whether the opacity be in the crystalline, or in the capsule[5], whether incipient, or advanced. Such applications tend only to feed a delusive hope, and vainly to torment those patients, who at last must have recourse to the opera-

[5] Tenon, Thèse aux Ecoles de Chirurgie de Paris, ann. 1757.

tion

tion, as the only sure means by which their sight can be restored [6] [7].

SECT.

[6] Antoine Maitre Jean, Malad. des Yeux, article de la Cataracte, Paris 1740. " Des autorités assez *graves* m'avoient fait croire autrefois que les cataractes dependantes d'un vice vénérien, pouvoient ceder à l'usage du mercure; mais, des observations multiplées, que j'ai eu lieu de faire depuis, m'ont absolument detrompé, et m'ont convaincu qu'elles etoient aussi rebelles à toutes especes de remèdes que les autres."

[7] Although the Translator assents to the truth of the observation here made, on the uncertainty of all known medicines to dissipate an opacity, either in the crystalline, or its capsule, or even to prevent the progress of such opacity when once begun, yet many cases have occurred, which prove that the powers of nature are sometimes sufficient to accomplish these purposes. The opacities in particular, which are produced by external violence, he has repeatedly seen dissipated, when no other parts of the eye have been hurt, in a short space of time; and, in general, in cases of this description, the crystalline humour has been dissolved or absorbed: which has been proved by the benefit the patient has afterwards derived from adopting the use of deeply convex glasses. In some of these cases, though the crystalline has been dissolved, the greater part of the capsule has remained opaque, and the light has been transmitted to the retina only through a small aperture which has become transparent in its centre. Instances, again, are not wanting, in which cataracts, which were formed without any violence, have been suddenly dissipated in consequence of an accidental blow on the eye. For these reasons, the translator is willing to hope that means may hereafter

SECT. V.

On the different Modes of operating for the Cataract.

TWO modes of operating, totally different from each other, have been practised, at different times, for the cataract; one by means of depression, which is called *couching*; the other by extraction. The former, and most antient of these, which is supposed to have been invented by Celsus, consists in piercing the coats of the eye, on the side next the small angle of the eyelids, and at the distance of about one-sixth of an inch from the cornea, with a straight

after be discovered, by which an opaque crystalline may be rendered transparent without the performance of any operation whatsoever. The remedies which have appeared to him more effectual than others, in these cases, have been the application to the eye itself of one or two drops of æther, once or twice in the course of the day; and occasional frictions of the eye, over the lid, with the point of the finger, first moistened with a weak volatile or mercurial liniment.

needle

needle[8]; by means of which instrument, the cataract is to be displaced and depressed. Needles that are round[9], and flat, blunt, and cutting, have at different times been employed in this operation; and by some, those that are shaped like the tongue of a carp have been considered as most convenient. The crystalline, by this mode of operating, is depressed below the pupil, and deposited in the inferior part of the vitreous humour. I cannot assent to the opinion of those practitioners, who think that it is here dissolved[1]; since what has been advanced in support of this opinion has not been confirmed by experience. In the opportunities I have had of dissecting, and examining the eyes of persons after death, some of whom had, long before, been operated upon according to this method of depression, I have always seen the crystalline entire, and in its natural shape.

[8] Celsus de Medicina, lib. vii. cap. 7. N° 14. de Suffus. p. 434. Amsterd. 1687.

[9] Heister. Instit. Chir. Amsterd. 1750. p. 569.

[1] Henckel. Dissert. Medic. Francofurti ad Viadrum, 1728.

The

The needles employed in depressing the cataract have been much varied, as I before observed, by different operators. The round needle appears to me to be the most improper; because it enters the eye with less facility than others, and, bruising the membranes through which it passes, is more apt to induce inflammation.

Avicenna[2] recommended the use of two needles; one sharp, to pierce through the coats of the eye, and the other blunt, to depress the cataract.

I cannot conceive it possible to extract a cataract in the way Albucasis[3] proposed, by introducing into the eye a hollow needle, in the shape of a canula, and sucking strongly at its extremity. It is equally unaccountable, that Rocho Mathioli, surgeon to Charles Ferdinand, arch-duke of Austria, should advise the introduction of a gold wire, inclosed in a canula, into the eye, to seize the cataract, (which he

[2] Lib. iii. Tract. 4. cap. 19.

[3] Appendix, varior. Instrum. Scultel. tab. 14. p. 63. fig. 1. 1672.

in

in common with his cotemporaries believed to be membranous) and, by gently moving the instrument, to extract the cataract on the point of the wire. This operation is described in Scultetus[4].

Bernard Albinus proposed to extract the cataract, which he also believed to be membranous, by means of an instrument resembling a small forceps[5].

Freytagius advised to extract the cataract with a needle bent like a hook. He insisted, that the cataract was in all cases membranous, and that it scarcely ever was occasioned by an opacity of the crystalline humour. The remark I have made above concerning this supposed membrane, applies equally to Freytagius[6], and to Heinr. Wilhelmus Geisler[7], who also maintained that the cataract was produced by

[4] Armament. Chir. p. 79. Amsterd. 1672.

[5] Heister. Instit. Chirurg. p. 580. tom. i. in 4to. Amsterd. 1750.

[6] Thèse soutenue à Strasbourg, en 1721.

[7] Dissertatio inauguralis medica de curandis præcipuis oculorum affectibus, &c. Erfordiæ, 1723, p. 8. § x.

an opaque membrane formed in the aqueous humour.

Petit recommended, in the operation of couching, carefully to avoid wounding the anterior portion of the crystalline capsule, and to divide only the lower part of its posterior portion. He was confident, that by this method, the vitreous humour filling up the space that was previously occupied by the crystalline, the rays of light would be refracted nearly as much as if the eye was in its natural state, and the necessity of using glasses afterwards would, in a great degree, be obviated[8].

I think it unnecessary to enter further into an explanation of the different modes of depressing the cataract, since this operation is at present almost universally exploded. Exclusive of many other inconveniences attending it, it is, in fact, in many cases impracticable. Not to speak of the opaque capsule, (which is entirely out of its reach,) if the crystalline be soft, and, as it frequently happens, al-

[8] Vide Platner, Instit. Chirur. in 8vo. anno 1783. p. 696.

most

most in a fluid state, its depression cannot be accomplished by means of the needle. This impossibility of depressing it has given rise to the assertion, as absurd as it is erroneous, that such a cataract is unripe[9], and not of a proper consistence to admit of an operation. It would, however, be in vain to wait till it gains solidity, since such a cataract continually becomes softer. It is therefore impossible that by this mode the patient should ever be cured. In vain do the advocates for depression exaggerate the accidents that follow the operation of extraction. It is proved by observation and experience, that they are much less considerable than those which attend depression.

[9] Percival Pott, Remarques sur la Cataracte, p. 498, traduit de l'Anglois par M. Semoine, 1779 (*a*).

(*a*) From the reference above made to Mr. Pott's remarks on the cataract, it appears, that the Baron understood Mr. Pott to entertain an opinion of the cataract's increasing gradually in consistence, and thereby becoming more and more fitted for the operation. In justice to Mr. Pott, the translator feels it incumbent on him to observe, that this gentleman took great pains to correct so great an error. And in proof of this, he refers the reader to Mr. Pott's Remarks on the Cataract, p. 5.

Cusson Remarques sur la Cataracte, p. 8, in 4to. Montpellier, 1779.

SECT. VI.

An Examination of the Objections against Extraction.

THE accidents which are charged upon the operation of extraction may be reduced to the eight following: 1st, the staphyloma;—2dly, pain;—3dly, the discharge of the vitreous humour;—4thly, the irregularity of the pupil;—5thly, the deformity of the cicatrix;—6thly, the closure of the pupil;—7thly, the secondary cataract;—and 8thly, the section of the iris.

1st, With regard to the staphyloma, I shall make it appear, that the mode in which we divide the cornea most commonly prevents this accident, by hindering the iris from coming forwards. But if such an accident should at any time happen, notwithstanding this care to prevent it, I hope to prove in the sequel, that it may be reduced by merely rubbing the eyelids;

lids; and that it does not occasion those ill effects which some authors have dreaded[2].

2dly, The unavoidable pain that attends the operation of extraction is to be moderated, as in other operations, by general remedies. It is, however, notwithstanding the assertion of a late author[3], less severe than that which is produced by depression.

3dly, It is difficult for any considerable portion of the vitreous humour to escape, when the operation is performed according to the mode I shall presently describe. If such an accident happen, in cases where the cataract is simple, where the vitreous humour is free from disease, and where the posterior part of the capsule does not adhere to the body of the crystalline, it must be attributed to unskilfulness in the operator, and must not be considered as a necessary consequence of the operation itself. When the posterior part of the capsule comes away, together with the cataract,

[2] Guntius, Dissert. de Staphylomate, Lipsiæ, 1748.

[3] Remarques sur la Cataracte, par Cusson, Montpellier, 1779, p. 31, in 4to.

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the effusion of a small portion of the vitreous humour may sometimes unavoidably take place; but this effusion, if small, does not necessarily destroy the sight, as will be evident from many of the cases related in this dissertation. In some patients, even a considerable effusion has not prevented the success of the operation; though in others, it must be owned, this accident has much diminished the clear perception of objects.

4thly, An irregularity in the figure of the pupil, is an accident which rarely occurs, unless the eye has been much fatigued during the operation; and even when this has happened, I have not always found that the irregularity has injured the sight; on the contrary, it is generally accompanied with an enlargement of the aperture of the pupil; which enlargement, if the cicatrix be slowly formed in the cornea, and extends far over this coat, will prove beneficial rather than injurious; because it will admit the entrance of a more considerable number of rays of light into the eye, than could have been admitted if the pupil were small.

5thly.

5thly. With regard to the cicatrix of the cornea, if the incision be made with one instrument, and one stroke; if it be near the margin of the sclerotica, and large enough to allow the opaque crystalline to pass through it without violence; in this case, the cicatrix will scarcely be visible, and will not at all obstruct the rays of light in their passage to the retina.

6thly, A total closure of the pupil is a misfortune which rarely happens after the operation of extraction, but much more frequently after that of couching [4].

7thly, A secondary cataract, by which I mean an opacity of the posterior capsule of the crystalline lens [5], takes place also much oftener after the

[4] The operation which I propose in cases of a closure of the pupil, is described at the end of this dissertation.

[5] The Baron, in this and many other parts of his treatise, mentions particularly the posterior capsule of the crystalline humour, *la capsule posterieure du crystallin.* But, notwithstanding there is unquestionably a considerable difference between the anterior and posterior portions of the capsule, in point of strength, the former being much firmer than the latter, the Translator believes it has never yet been proved that these are distinct one from the other. When such an opaque substance as is here described is perceived in the pupil,

the operation of depressing the cataract, than after that of extracting it; and, in the former of these cases, the method I shall propose for its cure is much more difficult to perform than in the latter. But, whether the opacity of the capsule be occasioned by one or the other of these operations, the needle is inadequate to the purpose of removing it, and effecting a cure; because, though it may be sufficient to puncture this membrane, yet, when punctured, the sides of the capsule can in no way be removed by the needle from their first position, and of course will still intercept the rays of light. It is not impossible that they may again unite. There remains, therefore, no other re-

pupil, after the operation either of extraction or depression, this opacity has appeared to him to be much oftener situated in the anterior than in the posterior portion of the capsule; and the former of these he believes to be alone capable of deriving relief from any operation. Sensible, however, that it is very difficult to distinguish between the opacity of the anterior and that of the posterior part of the same capsule, after the crystalline has been removed, he has here, and in many other parts of the present treatise, taken the liberty to translate the French words, *capsule posterieure du crystallin*, solely by the words, capsule of the crystalline.

medy

medy but the extraction of the opaque capsule, or of the portions into which it has been divided. For this purpose, an incision must be made through the cornea, and a small forceps introduced, with which the opaque portions may be taken away. This method, if the capsule has formed no adhesions [6], presents a flattering prospect of success; but it is a much more hazardous operation after a depression of the cataract than after its extraction. In the operation of extraction, for instance, the vitreous humour, and the cellulæ formed by its enveloping membrane [7], remain unhurt; but, on the contrary, in that of depression, it is indispensably necessary to break through this membrane, in order to provide a place in which to deposit the depressed crystalline; and, in

[6] If the opaque capsule adhere to the iris, and an attempt to extract it be persisted in, there is danger of separating the iris from its connection at the outer margin, and inducing blindness from this cause. A few instances, however, will be mentioned in the sequel, which shew that blindness is not always the consequence of such an accident.

[7] Riolan. Anthrop. lib. iv. p. 173, appears to be the first anatomist who accurately described the cellules of the vitreous humour.

consequence

consequence of the derangement of the vitreous humour produced by this dangerous operation, it is highly probable that during the extraction of a secondary cataract, an abundant discharge of this humour will take place. The following cases afford so many proofs of the truth of this remark.

CASE I.

Miss Deene, a lady of Ireland, having a cataract in each eye, put herself under the care of an oculist passing through Dublin, the place of her residence, who operated in the old way of couching. When he had depressed the cataracts, he withdrew his needle, and applied the usual dressings. After some days had elapsed, he examined her eyes; but she could not see at all, the crystallines having resumed their former situation. As the lady had suffered great pain under the operation, she would upon no account allow it to be repeated by the same oculist. She therefore determined to go to Paris, and to put herself under the care of my father;

father; who performed the following operation, in the year 1769, in presence of M. Pibrac. He began by removing the anterior part of the capsules of both crystallines, with the small forceps represented in fig. XI. These were become opaque in consequence of the former operations, and white lines were distinctly perceived to cross them, occasioned most probably by the point of the needle; which having pierced, and perhaps torn them, had altered their texture, although the sides of the wounds were afterwards re-united. The anterior portions of the capsules were scarcely removed, when the vitreous humour began to escape; on which account it became necessary, as quickly as possible, to extract the cataracts, which had sunk to the bottom of the eye. For this purpose an instrument shaped like a hook (see fig. X.) was introduced under the cornea, and with it the cataracts were seized and drawn out. It was afterwards necessary again to introduce the forceps into both eyes, to take away some large fragments of the posterior part of the capsule, which, now becoming visible, appeared to be

as opaque as the anterior. This part of the operation required great dexterity, and could not be accomplished without the escape of an additional portion of the vitreous humour.—Notwithstanding all these impediments, the young lady was perfectly cured; and from this time distinguished objects much better than could have been expected previous to the operation. She neither suffered from pain, inflammation, nor a staphyloma, and was soon able to read, with the help of proper glasses. The pupils, indeed, were irregular in shape, and larger than they usually are; but their enlargement in this, as in most cases of a similar kind, was rather beneficial than hurtful, because it permitted a proportionably greater number of luminous rays to enter the eye.

CASE II.

M. Percival, in Thames-street, London, had been twice couched by a surgeon of eminence, in the space of three years; and each time the cataract rose again, and resumed its former situation.

situation. Upon this, despairing of a cure from a similar mode of treatment, and having suffered greatly from the operations already performed, he, in the year 1770, consulted my father, who was at that time in London. Upon examination, the opaque crystalline was still found to be in its natural situation. The pupil was become irregular, and vertically oblong; and it was evident, that the anterior, as well as posterior portion of the capsule had been lacerated in the different attempts to depress the cataract. The vitreous humour also was considerably injured, and its cellulæ so much deranged, that no sooner had my father completed the incision through the cornea, than a part of this humour, in consistence like the white of an egg, immediately escaped. The cataract, now losing the support which it had before received from the vitreous humour, fell to the bottom of the eye. It became necessary, therefore, to seize it with a small hook, and thus extract it. This was not accomplished without difficulty, and the effusion of another portion of the vitreous humour. It was

then

then expedient, by means of a small forceps, to take away some opaque portions of the posterior capsule; which process was very painful, and occasioned the loss of an additional quantity of the vitreous humour. In order to prevent a still further loss of it, the operation was no sooner finished, than the eye was instantly covered, and the dressings were applied, without allowing the patient the usual satisfaction of trying whether he could perceive the objects about him. The treatment was simple; no accident occurred, nor did any pain or inflammation ensue[g]. When the eye was afterwards uncovered, the patient at first saw very little; but the sight sensibly increased from day to day; and after some time he perceived all objects pretty distinctly, the eye being of the same size and fulness as it was before the operation.

In the sequel of this work I shall have occasion to relate many similar cases, in which

[g] I have remarked, that when a part of the vitreous humour is discharged during the operation, the patient seldom suffers much pain.

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the recovery of sight was not prevented by the effusion even of a large quantity of the vitreous humour. All the difficulties, which attended the operation in the case above related, were occasioned by the two successive depressions which M. Percival had undergone; and there is reason to believe that none of these would have occurred, if the operation of extraction had been at first performed.

8thly, The last accident I mentioned, as chargeable on the operation of extraction, was a wound of the iris. This is not likely to happen, if the operation be performed in the manner I propose to recommend; since if, at any time, in making the section of the cornea according to this method, a portion of the iris becomes entangled by the edge of the knife, it may always be disengaged by gently rubbing the fore finger of the hand that is at liberty, on that part of the cornea which lies before it.

SECT.

SECT. VII.

On the Accidents produced by Couching.

SUCH are the objections that have been urged against the operation by extraction. But those against couching are infinitely greater, and the effects of it much more to be dreaded. This is too well confirmed by the incurable disorders to which the latter operation often gives rise.

1st, The pain of couching is not only severe during the operation, but it likewise torments the patient with apprehensions, too well founded, of the dreadful effects it may produce afterwards.

2dly, The vomiting, which frequently comes on at the distance of some hours after the operation [9], is apt to produce a collection of matter in the eye. This is particularly to be ap-

[9] Heister. Instit. Chir. pars I. sect. 2. cap. 55, in 4to. Amstelod. 1750.

prehended

prehended, if any of the ciliary nerves are wounded, which accident is not unusual in couching; and it is frequently occasioned by the puncture of the retina only, which is unavoidable in this operation[1].

3dly, The pain produced by the puncture of the retina and the ciliary nerves, is often followed by a suppuration of the eye, or by the formation of a secondary cataract.

4thly, Those persons who have undergone the operation of couching, sometimes feel constant and violent pains in the eye as long as they live. These pains are probably occasioned by the injury which the retina sustains, in consequence of its pressure between the choroides and the depressed crystalline. I have had an opportunity of dissecting and examining the eyes of two women, after their decease, who suffered unceasing pain from the time of the operation; and, in both these cases, the depressed crystalline was deposited on the retina, in the way I have here mentioned.

[1] Warner, Description of the Human Eye, &c. in 8vo. p. 107. Lond. 1775.

5thly, In introducing the couching needle, the blood vessels, both of the choroides and retina, are liable to be wounded; and the extravasated blood, in consequence of it, not only confuses the sight of the operator, but unless speedily absorbed, is very apt to produce a suppuration of the whole eye.

6thly, The soft and milky cataract cannot be depressed by the needle; nor can the needle be employed in such a case with any prospect of success. This I take upon me to assert, notwithstanding the opinion of a celebrated author [2], that the milky cataract, when placed in the anterior chamber, and mixed with the aqueous humour, or when depressed to the bottom of the eye, will, in either case, gradually dissolve and disappear, so as to leave no trace of its existence behind [3] [4].

7thly,

[2] Percival Pott, Remarques sur la Cataracte traduites, p. 509, 1779.

[3] Palucci, Remarques sur la Cataracte, p. 121, in 12mo. 1752.

[4] Notwithstanding the opinion of the Baron is here, and, in many other parts of his treatise, very decidedly given

7thly, After the crystalline humour has been depressed in the best manner possible, it is liable

given against the dissolution of the depressed crystalline, and even of the small portions of this humour that are sometimes left in the eye after the operation of extraction, the Translator has met with many cases which have led him to form a contrary opinion. He does not take upon him to declare that the depressed crystalline will always dissolve, since he has frequently seen that it will not; but he has no scruple in asserting that it sometimes has dissolved, and that under the management of different persons. He has also to add, that an opacity in the crystalline has occasionally disappeared, in cases where no operation of any kind has been performed; and in proof of this latter remark, he refers the reader to a paper on this subject, which was read before the London Medical Society in the year 1789, and afterwards published in their Transactions. In addition to the cases there related, he begs leave to observe, that he has since seen the anterior portion of a capsule, in the case of a cataract of many months continuance, largely punctured by an instrument introduced through the cornea for this purpose, in order to bring the aqueous humour into contact with the opaque crystalline; and in this case, at the end of some weeks, the cataract removed out of its capsule, and came forward into the anterior chamber, in which it floated a considerable time, gradually decreasing in size, until at length it totally disappeared. During the time that the opaque crystalline floated in the anterior chamber, the eye was constantly in a state of irritation; in consequence of which the patient was repeatedly requested to allow the

liable to rise again. Many have found it necessary repeatedly to have recourse to the operation[5], even at the distance of some years after the time when it was first performed. Cusson[6] asserts, that he has never known more than one instance of this kind; but as he did not apply himself particularly to this branch of surgery, it is not extraordinary that he should consider such a circumstance as scarcely possible. The opaque capsule cannot, I think, be mistaken for a true cataract, since, upon an attentive examination, the true cataract may always be distinguished by the appearance of its external rim, and by the slight motion which,

opaque body to be extracted: but he always objected to submit to it. The pupil remained large and clear, after the cataract disappeared, but the irritation, which its pressure on the iris kept up, continued so long, that it produced a true gutta serena, which totally destroyed vision. Some months after this, a cataract was completely formed in the opposite eye; which being extracted in the usual manner, the sight was thereby restored.

[5] Maitre Jean, Maladies des Yeux, article de la Cataracte.

S. Yves, Maladies des Yeux, de la Cataracte.

Joseph Warner, Description of the Human Eye, &c. in 8vo. p. 87.

[6] Remarques sur la Cataracte, par M. P. Cusson, Medecin. de Montpellier, à Montpellier, 1779, in 4to. p. 41.

under such circumstances, it is occasionally observed to undergo; whereas, on the contrary, when the capsule is opaque, the opacity rarely covers the whole pupil, and never admits the smallest change of situation. In such a case also, the opacity appears more deeply situated in the eye, than when the crystalline humour is the seat of it[7].

8thly, The ciliary processes which surround the crystalline are liable to be wounded by the different movements of the needle, which are necessary to be made, in order to complete the operation; and this must unavoidably increase the pain the patient undergoes.

The short comparison here drawn between the operation of extraction and that of depres-

[7] The author, by the description he here gives of an opacity in the capsule, must certainly mean an opacity in its posterior portion; but, from the observations the Translator has made in similar cases, he is disposed to believe, as he before remarked, that its anterior portion is much oftener the seat of the opacity. And if this be the case, the whiteness, instead of appearing deeper in the eye than when the crystalline itself is opaque, will necessarily appear more prominent.

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sion will, I think, be sufficient to demonstrate the superior advantages of the former, notwithstanding the contrary opinion of Pott, Callisen, Cusson, and others.

SECT.

SECT. VIII.

The History of the Operation of Extraction.

As soon as it was fully proved that the true cataract was an opacity of the crystalline humour,—that the loss or deprivation of sight would not necessarily be occasioned by the removal of this humour,—that the cornea may be divided without danger,—and that, if the aqueous humour be discharged, it will quickly be regenerated[8], the mode of cure by extracting

[8] The aqueous humour is regenerated with so much facility, that frequently, within three or four seconds of time, after the incision of the cornea has been completed, this tunic, which was flattened by the effusion of the humour, will be found to have resumed its natural convexity. I have sometimes seen it reproduced, even whilst my eye was engaged in observing it. This humour is not found to possess the same degree of transparency at all ages. In youth, it is more limpid than in advanced age. In the fœtus, and also in children newly born, it is, according to the remark of Zinn, p. 146. Descriptio Anatom. Oculi, &c. and of M. Sabbatier Traité d'Anatomie, p. 546, vol. i. &c.

ing the cataract out of the eye, must naturally, I think, present itself to the mind.

When Daviel first introduced this operation [9], the instruments he employed were much too numerous; but I shall not here dwell on their

&c. thick and reddish. In persons of a middle age it is very transparent, and slightly viscous. In some it possesses a considerable degree of saltness, which my tongue has often experienced when I have been employed in extracting the cataract. Though it may be frozen, as anatomists have proved by experiments, it is of a spirituous and volatile nature. These qualities it is necessary that it should possess, in order to favour the alternate contraction and dilatation of the pupil, whose motions would be much embarrassed, if the iris floated in a fluid which had more consistence. Anatomists are much divided in opinion with regard to the organs that secrete this humour. That opinion appears to me the most probable, which attributes this function to the terminations of the arteries of the iris. The vessels, which were said to be formed for the particular purpose of secreting and absorbing this fluid, and which were described by Nuck and Hovius, have never been perceived since their time, even by the best anatomists.

[9] Freytag was the first operator who made an attempt to extract the cataract, about the close of the 17th century. After him, Lotterius, of Turin, performed this operation. Daviel first communicated this method to the public. And the ingenuity and industry of Wenzel has, at length, brought this mode of operating to a state of perfection never before attained. Joannis Alexandr: Brambilla Instrumentarium Chirurgicum Austriacum, 1782, p. 71. tab. x.

description,

description, since a full account of them may be seen in the Memoirs of the Academy of Surgery at Paris [1].

La Faye, a celebrated surgeon of the same city, conceiving that the operation was rendered not only tedious and difficult, but often unsuccessful, by the multiplicity of instruments which Daviel employed, contrived a knife, with which he proposed to make the section of the cornea at one stroke. Some authors [2] have fancied a resemblance between this instrument recommended by La Faye, and that employed by my father, which I shall presently describe. But such a notion could only arise from an imperfect description of my father's knife, and not from an inspection of the instrument itself [3]. If La Faye's instrument, as described in the Memoirs of the Academy of Surgery [4], be compared with this of my father, it will be sufficient to undeceive the reader. The same might

[1] Tom ii. in 4to. p. 337. Paris, 1769.

[2] Guerin, Maladies des Yeux, p. 567, Lyon, 1769.

[3] Janin, Mem. sur les Maladies des Yeux, Lyon, 1772, p. 190.

[4] Tom. ii. p. 565.

be

be observed of the instruments recommended by Tenon [5], Sharp [6], and Tenaaf [7], all of which, indeed, bear a nearer resemblance to the instrument of La Faye, than to that of my father. There is one instrument, however, which has so striking a likeness to the latter, that it is, indeed, as exact as possible; and of this the reader may be convinced by perusing a small tract on the cataract, published at Gottingen, in the year 1770. The author of this tract was M. Richter, a German physician, who, when on his travels, made some stay in London, and there furnished himself, at Savigny's, a cutler in that city, with a dozen instruments, which were constructed for our use. Only a few months elapsed after M. Richter returned to Gottingen, before he published the pamphlet above alluded to; in which he presented to the

[5] Thèse sur la Cataracte, aux Ecoles de Chirurgie, Paris, 1757.

[6] Mem. de l'Academie de Chirurgie, tom. ii. p. 586.

[7] Korte verhandeling door voorbeelden gesterkt, nopens de nieuwe wyze om de Cataracta, &c. door Gerard. Tenhaaf, &c. in 12mo. te Rotterdam, 1761, fig. 1.

Journal de Medicine, Aout. 1761.

faculty

faculty our instrument, of which he appeared to claim the invention, notwithstanding my father had used it for more than twenty years before this time[8].

I shall not detain the reader with a description of the instruments which have been employed by many different surgeons in this operation, such as those of Coutouly[9], and Poyet[1], men of distinguished eminence in the profession; because these bear no resemblance to the instrument we use; nor does the description of them constitute any part of the design of this treatise.

It cannot be doubted, that many oculists,

[8] There can be no doubt, I think, that M. Richter assumes to himself the merit of inventing this instrument, since he often uses the expressions, *Cultellus noster*, and *Cultellus quo utor*, without mentioning my father's name. But I should not have noticed his want of candour in this respect, if many authors, and among the rest Krausius, in his Notes on Platner Planck's Treatise on Surgery, &c. had not so far been misled by him, as to bestow on this instrument the unwarranted appellation of Richter's Knife.

[9] Thèse aux Ecoles de Chirurgie de Paris, en 1766.

[1] Memoires de l'Academie de Chirurgie de Paris, tom. ii. 17.

who,

who, since the time of Daviel, have invented new instruments, and described new methods of extracting the cataract, have exerted themselves in this manner, with a view, which is very laudable on some occasions, to excite the notice of the public; but unfortunately, the result of their efforts has not always been answerable to their wishes.

A few years since, M. J** announced to the public a new mode of operating for the cataract. He obtained permission from M. Morand, who at that time was surgeon-major of the invalids, to perform the operation in that hospital, which he accordingly did before Messrs. Louis, Sabatier, and many other celebrated surgeons. He made his first incision through the inferior part of the sclerotica, at the distance of the twelfth part of an inch from the cornea, with an instrument resembling the ace of spades. This incision was sufficiently large to allow the admission of a second instrument, in shape like a small hook, fixed in a handle. M. J** made use of this to search, and as it were to fish for the crystalline; but unfortunately

unfortunately he, at the same time, fished out a large portion of the vitreous humour. He performed his operation on seven patients, neither of whom was restored to sight; but, in consequence either of the inflammation, the pain, the derangement of the internal parts of the eye, or the quantity of the vitreous humour that was discharged, the power of vision was irretrievably destroyed. My father, unable to resist the solicitations of M. Morand, operated, in the same hospital, on the same number of patients, and restored them all to sight. Since this time, it appears that M. J** has wonderfully improved his mode of operating. If we consult his treatise on disorders of the eyes, we shall find he makes no mention of the operation I have above related, as performed by himself; but describes that which was performed by my father, to which he is pleased to give a decided preference[a]. His description, however, of the knife we use, and the fancied similitude he discovers between this instrument and that of La Faye, evidently shew that he is egregiously mistaken in his idea of it.

[a] Memoires sur les Maladies de l'Œil, p. 190.

SECT IX.

Cases proper for the Operation of Extraction.

BEFORE I proceed to describe the mode of operating I have to recommend, it is necessary to point out the particular cases to which this operation is adapted, and in which it affords a prospect of success; and to distinguish them from those cases in which there is little ground of hope, as well as from those in which it is wholly improper to undertake it.

The following circumstances are generally favourable to the success of this operation.

The opacity of the crystalline should be readily discerned, the subject healthy, the cornea transparent, and the other parts of the eye in their natural state. It is desirable also, that the eye-lids should be free from œdema, and that the eye should secrete its due proportion of tears; being neither too watery, nor too dry. When, on the contrary, the lids are œdematous,

tous, and the eye watery, depositions of matter sometimes come on, forming a species of hypopion, without violent pain, but almost always preventing the recovery of sight; especially if the means I have prescribed be neglected. In such cases I have always found it useful, eight or ten days previous to the operation, to apply a blister to the nape of the neck, and to keep up a discharge from the part on which the blister is applied, until the success of the operation shews it to be no longer requisite[3]. It is scarcely necessary to add, that proper internal general remedies should also be administered.

[3] The Translator considers this as a very important remark. The cases to which the Baron here alludes are not uncommon, and the tumefaction of the lids is generally accompanied by an excoriation of their edges. Besides the use of blisters, and other general remedies, those local applications should also be employed which are most effectual to correct acrimony, and abate irritability; nor should the operation be undertaken till every symptom of disorder in the lids be fully removed.—See, in connection with this subject, Remarks on the Ophthalmy, Psorophthalmy, &c. by the Translator, second edition, published in 1787, by Dilly.

It

It is desirable that the patient be not subject to habitual pains in the head, since these pains sometimes return with great violence after the operation, and occasion some other very troublesome symptoms. I have observed that men are less liable to such pains than women, in whom they are commonly attended with more serious effects. It is just as necessary in this case, as in that last mentioned, to apply a blister to the nape of the neck, two or three weeks before the operation. The natural evacuations should also be promoted, particularly by purging; which I have found so beneficial, that, under these circumstances, it cannot be too strongly recommended.

Among the symptoms that promise success to the operation, a free motion of the pupil, and that degree of sensibility in this part, which manifests itself by its quick contraction, upon a sudden exposure to the light, is very desirable. It should, however, be remembered, that some pupils retain the power of contracting and dilating, though the optic nerve be totally paralytic,

lytic. This phenomenon will be clearly explained, upon attending for a moment to the structure of the eye. The motion of the pupil is produced by the action of the ciliary nerves distributed to the iris; and these spring from the semilunar or lenticular ganglion, which is formed by a junction of the nasal branch of the nervus ophthalmicus Willisii, or first branch of the fifth pair, with a branch of the third pair, or motores communes. Now, these nerves may retain their sensibility entire, and communicate it to the pupil, though the optic nerve, whose pulpous expansion constitutes the retina, or the seat of vision, may be in a state of total insensibility. In this state of the eye, it would be useless to perform any operation, though the pupil preserved its power of motion; and it may be known by the absence of those favourable symptoms I have mentioned in the beginning of this section, and by the total inability of the eye to perceive the difference between day and night[4]. Persons

[4] When one eye only is affected, and it becomes neces-

Persons who are in the habit of attending disorders of the eyes, know well that these cases sometimes occur; though it much oftener happens, when the optic nerve is paralytic, that the pupil is nearly, if not entirely, deprived of the power of motion.

There are, likewise, persons whose sight is good, and yet the pupils of whose eyes, upon the most attentive examination, in different degrees of light, discover no motion whatsoever. I have extracted the cataract from several eyes so circumstanced, and with the most perfect success. The following cases are adduced in support of this assertion; and it is confirmed by a remark I have repeatedly made; that, after the operation has been most successfully performed, and the sight has been restored as completely as possible, the pupils have, not-

sary to examine the pupil of this eye, care must always be taken to cover the sound eye. Without this precaution, there is danger of forming a mistaken judgment; since the pupil of the diseased eye will often borrow its motion from that of the sound one, if both are exposed at the same time, and the pupil of the latter still retains its faculty of moving.

withstanding,

withstanding, often remained almost without motion.

CASE III.

My father having been sent for to Vienna, in the year 1760, to give advice to the Empress-Queen, who had a considerable relaxation of the eye-lid (of which she was soon cured) operated, during his stay in that city, on the General-Marichal Molck, the pupils of whose eyes had no motion, and the crystallines were so black, that both the celebrated Van Swieten and De Haen imagined his disorder to have been a gutta serena. As, however, it appeared to my father, after the necessary questions, and a due examination of the eye, that the operation was likely to succeed, the General determined to submit to it. The cornea, and the anterior part of the capsule of the eye first operated upon were scarcely divided, when the crystalline escaped through the incision with great velocity, fell at some-distance from the patient,

and broke into two parts. Upon examination, it was found to be almost black, firm, and of the consistence of plaister. The crystalline of the second eye came out entire; my father taking care gradually to drop the upper lid, in proportion as the incision of the cornea advanced; in order to prevent its sudden explosion. This was as black as the first, much more solid, and almost stony. The General had no bad symptoms after the operation, and in the usual course of time recovered his sight[5].

It

[5] Though it cannot be denied that a cataract sometimes exists in an eye, whose colour is dark, yet this darkness is very different from the clear black appearance which the pupil has, not only when the eye is in a state of health, but also when it is affected with a true simple gutta serena; and if the cataract be in a state favourable to the operation, this opacity is rarely, if ever accompanied with a fixed pupil. Notwithstanding the success, therefore, which attended the operation in the case described above, as well as in those cases which immediately follow, complicated as they were, not only with a blackness but immobility of the pupil, the Translator is of opinion that they ought not to be adopted by practitioners as precedents, to which they may safely adhere in cases of a similar description. It is, on the contrary, a rule, as certain as almost any

It is surprising that the celebrated Pott should deny the existence of this species of the hard cataract [6]. Many examples, analogous to that which I have here recited, may be found in the works of St. Yves, Maitre Jean, and Gendron; and indeed, they happen so frequently, that there can be no reasonable doubt on this subject.

CASE IV.

The late M. Recolin, member of the Academy of Surgery at Paris, had two cataracts, one of which was much more advanced than

any in surgery, that when an eye, in a state of blindness, is accompanied with a clear black pupil, which is incapable of varying its size, according to the degree of light to which the eye is exposed, this blindness is produced by a defect of sensibility in the immediate organ of vision, and removable only by the application of proper stimuli to rouse it again to its natural action.

[6] The Baron, in support of this censure on Mr. Pott, refers to the translation of his works into the French language, p. 501. The Translator, however, is afraid that there is a mistake in the translation, as he cannot find such an opinion expressed in any part of Mr. Pott's original works.

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the other. The crystalline of the eye, in which the cataract was completely formed, was extremely opaque, although the patient could distinguish day from night, and the shadow of the hand when moved before the eye. But of the different circumstances requisite to the success of the operation, one, which has usually been considered essential, was wanting; I mean the free motion of the pupil. As the pupil of the other eye, however, in which the cataract was only incipient, was also immovable, my father determined upon the operation, which he performed in the presence of Messrs. Louis and Delaporte. It succeeded perfectly well, although the pupil still retained its fixed and motionless state. About a year afterwards, my father performed an operation upon the other eye, and with like success; the pupil, here also, remaining as immovable after the cataract was extracted as it was before.

CASE V.

M. Tonnelier, of the household of Madame Adelaide, of France, was in a situation nearly similar

similar to that of the two persons, whose cases I have last described. He had been under the care of many oculists in Paris, all of whom had considered his complaint to be a palsy of the optic nerve. And under this idea, he for a long time used the various remedies that are recommended for this disease, but without effect. At last, he consulted my father, who encouraged him to hope for the restoration of sight by submitting to an operation. The patient, who had never before suspected he had cataracts, was the more gratified by this opinion, because the surgeons he had before consulted had never once suggested such an idea, and he had hitherto thought his malady to be absolutely incurable. My father performed the operation upon both eyes, and the patient afterwards distinguished perfectly every object that was placed before him. Both the crystallines were equally black[7], and of a very hard consistence;

[7] This alteration in the colour of the crystalline must not be confounded with that of which Mr. Pott speaks, under the name of the *black cataract*; by which name the Germans

sistence; and both pupils possessed a very small degree of motion. It was, doubtless, on account of the black colour of the cataract, and the immobility of the pupils, that the disorder had been considered as a gutta serena.

The preceding case shews that much experience and judgment are requisite, in order properly to distinguish cataracts, when accompanied with these symptoms, from other disorders of the eye. But I shall speak more particularly of this difficulty, and of the means of obviating it, in another part of this dissertation.

CASE VI.

I was consulted by a young woman who had had a cataract in her right eye from the time of her birth. The pupil of this eye was fixed; but that of the left, the sight of which was perfect, retained its proper motion. Notwithstanding

mans understand a palsy of the optic nerve, or gutta serena. See Mr. Pott's Remarks on the Cataract. See also, Morgagni de Sedib. et Causis Morborum, Ep. xiii. p. 207. vol. i. in 4to. at Yverdon, in Switzerland; where the epithet of a black cataract is also given to a palsy of the optic nerve.

the

the want of motion in the pupil of the right eye threw an obstacle in my way, yet I determined to undertake the operation, because every other symptom encouraged me to entertain hopes of success. I found the forepart of the capsule not only opaque, but as hard as bone, and brittle. No instrument could puncture it; and at length the capsule came out of the eye entire, with the cataract contained within it. The cure was not less perfect on this account; and the pupil, after the operation, became as movable as that of the other eye, which was not diseased.

This case affords a proof that the immobility of the pupil is sometimes occasioned by the pressure of the anterior part of the capsule against the posterior surface of the iris. It will be seen, as I proceed, that this immobility of the pupil often accompanies the hydatid tumour, that is produced by a partial dissolution of the crystalline, whilst contained within its capsule; and, in this case, it is evident that the pressure of the projecting capsule against the surface of the iris, is the cause of its immobility.

To

To the cases here mentioned, I could add many others, which prove to a demonstration, that a fixed and immovable state of the pupil, unless it be accompanied with other unfavourable symptoms, ought not to be regarded as an objection to the operation. The success attending it, when the pupil has been thus fixed, has often been as complete as when all the symptoms have been favourable; and we may be enabled to judge, if this immobility be a natural or preternatural state of the eye, by enquiring whether the sight be wholly lost, or whether any degree of it still remains; and also by observing when one eye only is affected, whether the pupil of the sound eye be equally immovable with that of the diseased eye.

It is not so easy to distinguish a black cataract from a gutta serena. Though the difference in the appearance of the eye in those two disorders be small, it may, however, be distinguished, by a careful observer; since the diseased crystalline has always a peculiar appearance, unlike to that of the bottom of the eye.

The colour of the crystalline is, in general,

of

of very little consequence in the operation of extracting the cataract. When it is very white and fills the whole aperture of the pupil, it is usually soft, and sometimes fluid; but under these circumstances it is more probable that the operation will prove successful, than when the crystalline is hard, because it comes out of the eye with less difficulty. It might be supposed, when the crystalline is soft, that it is unnecessary to make the incision in the cornea so large as when it is hard. But I am of opinion, that it is almost of as much consequence, that it be made large in this case, as when the crystalline is voluminous; and I will give my reason for this opinion. When the crystalline is soft, the viscous matter that accompanies it cannot always be extracted, even with the most diligent search, and the most skilful use of the curette; in fact, it sometimes continues to pass off gradually for four-and-twenty hours after the operation. But if the incision of the cornea be small, the aqueous humour, with which the viscous matter comes away, does not pass so freely as when the incision is larger,

and

and consequently this matter may be retained within the eye; in which case it will obscure the sight if it do not entirely obstruct it. I am convinced, by experience, that the operation requisite to this species of the cataract excites but little pain, and that the wound occasioned by it in the cornea is closed up very soon, without producing either an inflammation or staphyloma.

SECT.

SECT. X.

On preparing Patients for the Operation.

HAVING pointed out the cases in which the proposed operation may be successfully practised, I should now proceed to describe the operation itself, were it not neeessary, first of all, to add some remarks upon the means which it has been thought proper to adopt, in order to prepare persons for submitting to it.

It has usually been advised to pursue a plan of prepasation for some time before the operation is performed [8]. The means in common practice are bleeding and purging, together with a diluting and cooling diet. But if the patients, in other respects, enjoy a good state of health, I am fully persuaded that such

[8] Hoin, Memoire sur la Cataracte Capsul, in the Memoirs of the Academy of Surgery at Paris, vol. II. in 4to, 1769.

a regimen is at least unnecessary. In common cases, I think it sufficient that the patient should put his feet in a warm bath the evening before the operation, and have a glyster injected, in case the body be not open.

Plethora which tends to inflammation, acrimony, and heat, are the inconveniences chiefly to be guarded against; wherefore bleeding, and cooling remedies, may be omitted, unless the necessity of them be indicated by these symptoms.

If the primæ viæ be obstructed by indigestible substances, emetics and cathartics should be administered; but, where there is no such indication, they would produce more harm than good.

I should indeed advise, as a necessary precaution, to diminish the quantity of the patient's food, five or six days previous to the operation; and during this time, I usually prescribe a vegetable diet.

The proper season of the year for performing the operation, is still a subject of much conjecture. It is necessary, as much as possible,

to

to avoid very hot weather; because patients are in general obliged to keep in bed afterwards. Some have preferred the spring; but in cases of necessity all seasons are alike indifferent.

SECT.

SECT. XI.

A Description of the Knife we employ in dividing the Cornea.

ALTHOUGH the success of all chirurgical operations depends much more on the skill of the operator, than on the figure of the instruments he employs, yet these have their share in contributing to his success; and therefore they deserve a particular attention. It is a general observation, that instruments the most simple in their form are the best adapted to use: it is surprising, therefore, that surgeons should have been so slow in attaining to a sufficient degree of simplicity, in the construction of instruments for extracting the cataract. In this respect, I may venture to assert that no instrument is superior to that which was contrived by my father, and which he has now employed with success for upwards of five-and-thirty years. It is no where described but in a dissertation published by

by M. Richter, in the year 1770, who procured some of these instruments from our instrument-maker in London. But, as it is reasonable to suppose that the inventor should understand his own instrument better, and be able to describe it with more accuracy than his copyist can possibly do, I proceed to give the reader a particular description of it; and, in doing this, I shall take occasion to rectify some mistakes which have escaped the notice of the Gottingen physician.

The instrument, which from its use in dividing the transparent cornea, might more properly be called *Ceratotome* than *Ophthalmotome*, resembles the common lancet employed in bleeding, excepting that its blade is a little longer, and not quite so broad. Its edges are straight; and if it has sometimes the appearance of convexity, like that in the figure which M. Richter presented to the public, this is owing to a fault in the maker. The blade is an inch and a half (eighteen lines [9]) long, and a quarter

[9] A line is the twelfth part of an inch.

of an inch (three lines) broad, in the widest part of it, which is at the base. From hence it gradually becomes narrower towards the point; so that this breadth of a quarter of an inch extends only to the space of about one third of an inch (four lines) from the base; and for the space of half an inch (six lines) from the point, it is no more than one-eighth of an inch (one line and a half) broad.

But, in order to convey a full idea of the shape and use of this instrument, its two edges must be described with still more accuracy than its length and breadth; because these are more immediately concerned in the operation. The lower edge, by which I mean that which is usually lowest during the operation, is sharp through the whole length of the blade. At the distance of a quarter of an inch (three lines) from the base, this lower edge has a slight projection, which is of use in making the section through the cornea, as will be shewn more particularly in its proper place. The upper edge I describe as divided into three portions. For the space of five-sixths of an inch (ten lines) from

from the basis, this edge is blunt, and very slightly flattened. For the space of half an inch, or rather six lines and a half further towards the point, it is blunt and rounded; although to the naked eye this part appears sharp, on account of its being very thin. And the extremity of this edge, to the extent of one-eighth of an inch (one line and a half) from the point, is keen like the lower edge, in order to facilitate the conveyance of the instrument through the cornea.

It may be useful here to take notice of the projecting part of our instrument. This sometimes appears greater than it really is, in consequence of the instrument-maker's narrowing the blade too much from its broadest part to its basis. Since the whole length of the blade is never used in the operation, and since, in dividing a cornea of the largest size, no more than from ten to twelve lines of it, at the utmost, can be employed, that part of the instrument which is nearest to the handle is of very little importance; and the instrument-maker, by giving it more or less breadth, will cause the

past of the instrument in the middle division to appear more or less projecting. This I suppose to have been the case with the instruments which M. Richter procured from our cutler in London. In the figures he has delineated, that which represents the instrument plunged into the cornea, is perfectly similar to ours; whilst the edge of that which is delineated singly, has too great a degree of convexity. The middle part of his blade, on the flat side, is represented as having a kind of swelling to denote its thickness. This has no other use than to give a little more strength to the instrument, to prevent its bending; and M. Richter is mistaken when he asserts, that this thick part of the blade is designed to keep the instrument at a distance from the iris, and so to prevent this membrane from being wounded[1]. Far from preventing such an accident, we are of opinion, that this fulness of the blade would rather tend to produce it. But all instruments, without care, are apt to occasion this accident; it may, however,

[1] Fascicul. de Cataract. p. 26. Gottingen, 1770.

always be obviated by a dextrous operator, and is not to be apprehended, if the mode of operating which I am about to describe, be adopted. In short, this swelling in the middle of the blade is merely intended to prevent the instrument from breaking, which might otherwise happen, if its point should be entangled, as I have sometimes seen it, in the tough edge of the sclerotica, which incloses the border of the cornea.

The blade of the knife should be made of well-tempered steel, in order that it may take a good polish, and have a sharp point and edge.

The handle, in which the blade is fixed, has eight sides, which are alternately large and small; or, rather, it is a quadrangular prism, whose four angles are cut off, and slightly rounded. In this form it appears to us more convenient than when it is cylindrical; because it may be held more firmly between the fingers; and because it is not so apt to turn round in the hand. It is generally three inches and two-thirds in length, and from two lines to two and a half in thickness. The blade is so fixed in the handle, that the two sides of the former lie

parallel

parallel with the broadest sides of the latter. On the upper side of the handle, which answers to the upper or blunt edge of the knife, a small mark is placed, which directs the proper manner in which the instrument should be held in performing the operation[a].

The same instrument is adapted to both eyes; and it is directed with equal facility by the right-hand and the left. It is, nevertheless, proper that the operator should be provided with several instruments, as the same ought never to be used on both eyes, even when the operation is performed on both, in succession, in the same day. Whatever care may be taken to cleanse it, the blade, after the first operation, is soiled with an unctuous greasy substance, which prevents it from cutting clean; and repeated observation convinces me, that the blade cannot be so perfectly cleansed from this unctuous matter adherent to it, as that it may be again fit for use, until some hours after the first operation.

[a] See the figures, and their explanation, at the end of this treatise.

Such

Such is the form of the instrument invented by my father. The accurate description I have given of it sufficiently points out its simplicity and its advantages. It bears no resemblance to any of the instruments proposed by other surgeons. Its shape is well calculated to effect the division of the cornea with the utmost ease and safety, as it cuts this membrane in proportion as it enters into the eye; and the aqueous humour cannot escape, at least not in a considerable quantity, until the knife has made its way quite through this tunic. It cuts only with its lower edge; and the upper edge, being blunt, can do no injury to any part with which it may come into contact. It has one striking advantage over the instrument invented by De la Faye, with which it has been improperly compared[3]; and this is, that when it has penetrated the anterior chamber, it is equally distant from the iris in every part, and may easily be brought out of the cornea, on the inside next the nose, exactly opposite to the point by

[3] See Guerin's Maladies des Yeux, and Janin's Maladies de l'Œil.

which

which it entered this tunic; an advantage which our straight blade must necessarily possess over a curved blade, like that of M. de la Faye. It is needless to observe, that it differs very much from that of Beranger, in which the convexity of the edge is so considerable, that it renders it difficult to divide the cornea, as it presses against, rather than cuts through this tunic. Beranger's instrument has also a tendency to force the eye into the inner angle of the orbit, and consequently it occasions the greatest difficulty in bringing the knife properly through, on the inner side of the cornea[4].

SECT.

[4] The Translator begs leave to observe, that the knife which he has been in the habit of using (see Fig. XV. in the annexed plate) is, in regard to its dimensions, not unlike the instrument employed by the Baron. The principal difference between them consists in this circumstance; that the Translator's knife is less spear-pointed: in consequence of which, when this latter instrument has pierced through the cornea, its lower, or cutting edge will sooner pass below the inferior margin of the pupil, than that of the Baron represented in Fig. I. &c. in the same plate. On this account the Translator is of opinion that the iris will be less likely to be entangled under the use of the knife now recommended, than under that of the Baron, when the instrument

SECT. XII.

On the Inutility and Inconveniences of Specula.

IT is very extraordinary, that amongst the eminent persons who have described the operation of extracting the cataract, most of them have enumerated amongst its principal difficulties, the quick and convulsive motion of the eye; and that they should have taken so much

strument begins to cut its way downwards, and the aqueous humour is discharged.

The Translator has only to add, on the construction of the knife, that great care should be taken to have it increase gradually in thickness from the point to the handle; by which means, if it be conducted steadily through the cornea, it will be next to an impossibility, that any part of the aqueous humour should escape, before the section is begun downwards; and consequently, during this time, the cornea will preserve its due convexity. But if, on the contrary, the blade be so formed as not to increase in thickness from the point; or if it be incurvated much in its back or edge, it will unavoidably happen, that the aqueous humour will be spilt before the puncture is completed; and the iris, being brought under the edge of the knife, will be in great danger of being wounded by it.

pains,

pains to contrive instruments for the purpose of fixing it. Long experience has taught me, that these instruments are always unnecessary, and that a dextrous person may, in every case, as I shall describe more fully hereafter, easily seize a moment to perform the operation, in which the eye is motionless. The different instruments which have been contrived to fix it, not only render the operation more complicated in itself, more dreadful to the patient, and more embarrassing to the operator, but they are also very liable to irritate and wound the eye. On these accounts they have been relinquished by almost all operators; and even by the inventors themselves. This has been the fate of the instruments contrived by Beranger, Guerin, Pope, Petit, Le Cat, and many others, of which I shall take no further notice at present. The needle invented by M. Poyet, which has a hole pierced in it near the point, does not answer its intended purpose, at the time when its assistance is wanted; since, before the thread which is to fix the eye can be disengaged from the needle, this instrument must be passed through both

sides

sides of the cornea[1]: and it is then needless to use any particular means for this purpose; because the instrument employed to divide the cornea, when it has been carried through the anterior chamber, and its point is come out on the side next the nose, will of itself fully answer this intention. An eye thus traversed may readily be disengaged from the great angle to which it retires, and be brought back again to the position that shall be most convenient for completing the incision.

The instrument called *la Pique*, invented by M. Pamard, a surgeon at Avignon, has suggested the idea of most of the specula invented since his time; and this may seem less exceptionable than many prior inventions. But, if we consider it attentively, we shall find, that the great distance at which the hand of the operator must be held from the eye, will render it very difficult for him to direct the instrument properly; so that on this account, the operation will necessarily be impeded by it. M. Rumpelt has in

[1] See les Mem. de l'Acad. de Chir. vol. ii. p. 353.

some

some measure guarded against this defect, in the instrument invented by him, (see fig. 12, in the plate annexed) which is nothing more, as described by Feller, in 1782[6], than a thimble, at the end of which is a sharp-pointed instrument like the pique of Pamard. This thimble

[6] See the figure of this instrument, in a treatise on the cataract, published at Leipsic, which has for its title, *Libell. de Methodis Suffus. Oculor. curandi à Casâ amata, et Simone cultis*, published by *Christian Gothold. Feller* 1782. Krausius, in his Notes on Platner's Institutes of Surgery, expresses himself in the following manner on this instrument:

" Hastulam *Pamarti* applicatam generi cuidam digitalis " ferruminando jussit jungi *Rumpeltus*, chirurgus dexterri- " mus. Digitale id digito medio aut annulari impositum " mucronem hastulæ in eodem loco bulbi imprimit, dum " interea digitus index manûs ejusdem palpebram inferio- " rem diducit. Similem quidem hastulam, vel si mavis " unum habet ferramentum quo *casa amata* ad bulbum " oculi stabiliendum utitur. Id bis flexum refert figuram " literæ Romanæ S, in cujus capite est hastula illa. *Ico-* " *nem apud Fellerum, l. c. inspice.* Cuspis autem ferra- " menti imprimitur non in conjunctivâ sed in corneâ, eo " quidem loco qui à conjunctivâ dimidiam linea distat et " punctum illud in quo cultellus corneam pertundit et in- " greditur è diametro spectat. Scalpellum Chirurgus ita " promovet, ut is eo ipso loco corneæ ubi hastula impressa " est, è camera oculi egrediatur. Cavetur sic conjuncti- " væ, cujus, utpote sensilioris, læsio alioquin inflammati- " onem augere potest."

is

is to be placed on the middle finger of the operator. Now, if we could approve of any sort of speculum, we should certainly give the preference to this, because it does not obstruct the use of the fore finger, but leaves it at liberty to keep down the lower eye-lid.

Some among the moderns have supposed that the use of specula is proper during the section of the cornea, in order to prevent the iris from being wounded; which accident, they think, is particularly to be apprehended when the eyes have a quick motion. But experience shews, on the contrary, that such instruments are more frequently the cause of this accident than the means of preventing it.

The most simple, as well as the surest method to avoid wounding the iris, when it becomes entangled under the edge of the knife, is to press the iris gently down with the fore finger applied over the cornea, at the same time that the middle finger is employed in keeping the lower lid from rising. In consequence of this, the iris will instantly be found to retire, and quit the knife, which is then steadily to be pushed on,

on, until the incision be completed. If the fingers of the operator were engaged in holding a speculum, the operator could not have recourse to this mode of liberating the iris; and therefore, by using such an instrument, he would be in greater danger, than if he did not use it, of cutting this membrane. Though the speculum of M. Rumpelt be fitted to the middle finger, yet the fore finger, by means of it, will be kept at so great a distance from the cornea, that it cannot properly assist in disengaging the iris; and even if it could be brought nearer, still it would often be useless; because in cases where the instrument is much entangled in the iris, both fingers are necessary to disengage it, and therefore both should be entirely at liberty. I need not add, that, besides this inconvenience, which has led us always to shun the use of instruments for the purpose of fixing the eye, the speculum of M. Rumpelt further partakes of the inconvenience which is common to all specula, that of rendering the operation complicated and intricate: and this is a circumstance very much to be dreaded if the patient falls into the

the hands of an unskilful operator; since, by means of it, he may irritate and inflame the eye, and, by a very slight pressure, rupture the capsule of the vitreous humour, which, in some species of the cataract, is remarkably tender.

I might here add some other general remarks on the instruments constructed for the purpose of fixing the eye; and I might dwell on the great difficulty under which the operator who employs them labours, from the want of a free, unconfined, and unembarrassed use of both hands. This constraint might, doubtless, give occasion to no small inconvenience. But, waving this, it is evident that the point of Rumpelt's instrument must necessarily irritate and lacerate the membrane to which it is applied, although the object of fixing the eye, by this means, be really attained. I may be told that the cornea is totally insensible, and that no mischief is to be apprehended from its being punctured. The uneasiness produced by foreign substances adhering to it[7], by the eye-lashes when

[7] Various authors have related cases in which foreign substances

when turned inward, and rubbing upon it, and by various other causes, daily contradict this assertion.

substances, having insinuated themselves into the eye, have become attached to the transparent cornea. I have seen many of these, and believe it to be an accident which happens much more frequently than is commonly supposed, especially among artificers who work in iron and steel. Among many instances which I could enumerate, if it were my design to treat of this particular subject, I shall select one which is very remarkable.

In the year 1784, Mad. Thaurin, in the Ruë du Jour, consulted me on account of her nephew, a little boy, who had a singular complaint in the left eye. A round yellowish spot was perceived on the cornea, elevated above its surface, and resembling a small bladder. From this spot proceeded a number of varicous vessels, diverging like radii from a center. The cornea being, in a great measure, covered by these, the eye was almost wholly deprived of sight. The child had been under the care of several oculists in Paris, who had considered his disorder as a *phlyctene*, or blister, on the cornea, and had accordingly, for many months, prescribed remedies for its removal, without the smallest success. On carefully examining the eye, I could not conceive the complaint to be a mere blister because of the yellow colour of the spot; and having occasionally seen many cases of a similar nature, it struck me, that the projection, in this instance, might possibly be produced by a foreign body fixed on the cornea. I was encouraged in this opinion by considering, that the child suffered very little pain; that the light did not much affect the eye; and that the remedies applied had produced no effect. To ascertain this circumstance, I touched the spot repeatedly,

assertion. The formation of the unguis, and the elongation of its varicous vessels over the cornea, fully prove, not only that the conjunctiva is continued over the cornea, but also that this tunic is highly sensible. A puncture of it cannot therefore be looked upon as an indiffer-

repeatedly, but with much difficulty, on account of the untractableness of the child, with the golden needle, which we use in operating for the cataract; and after several attempts to detach the foreign substance, I at length happily succeeded, and completely removed it from the cornea. I found it, upon examination, to be a part of the hard skin of a millet seed; which, having fallen into the child's eye, stuck in the cornea in such a way that its sharp edge and concave side adhered to this membrane, while its smooth and convex surface made a slight projection outwards. The accident had happened about four months before I was consulted, at the time the child was looking up at a cage, from which a bird was scattering the husks of millet seeds after he had bruised them with his bill. This skin, had by degrees, made its way into the cornea, in consequence of the repeated pressure of the eye-lids, and its colour had misled the practitioners, who, at first, had the care of the child.—After having removed this foreign substance, I perceived a cavity in the center of the varicous vessels, which plainly pointed out the place where this substance had been lodged. I applied nothing to the eye but common fresh water. The cause that had produced and continued the disorder being removed, the varicous vessels subsided of themselves, and in a very few days no trace of the accident remained, and the sight of the eye became as perfect as ever.

ent circumstance. And, besides this objection to Rumpelt's instrument, the pressure made at one and the same time, in two opposite directions, on one side by the speculum, and on the other by the knife, must occasion the aqueous humour to escape with great rapidity as soon as a passage is opened for it. In consequence of this, the iris coming forward will not only be in danger of getting under the edge of the knife, but of being totally enveloped by it; and in this last case, its division will be almost inevitable. The time when it is of peculiar importance to have the eye steady is, when the knife, having passed through the anterior chamber, is on the point of piercing through the inner side of the cornea, in order to complete the incision of this tunic. Now, when a speculum is used, the whole compression, at the instant, will be on the inside of the cornea; and, if the eye be subject to convulsive motions, it will, at this time, as I have occasionally seen, give a sudden turn towards the instrument. Again, when the aqueous humour has been prematurely squeezed out by the pressure of the speculum, before the knife

knife has pierced through the inner side of the cornea, this tunic becoming flaccid, the passage of the knife through it will often be rendered extremely difficult.

From what has been said, I think it is evident that none of the instruments above mentioned are competent to the purpose of fixing the eye at the instant when it is most desirable that this end should be obtained. I am persuaded that no one will make use of them, when once he has given them a fair trial, and has proved by experience their many inconveniences. It is likewise my invariable opinion, that the fewer instruments are employed,—the less the eye is fatigued,—and the more simple the mode of performing the operation,—the more certain will always be its success. Instruments to fix the eye may possibly be used with safety, when they are applied to an eye naturally steady; though, even in this case, it will be better to reject them. And when, on the contrary, the eye, on being touched, is liable to a convulsive motion, the application of instruments to confine it will be found nearly as dif-

ficult as the operation itself; and the points of these instruments, during the quick motions of the eye, will, almost unavoidably, injure the parts to which they are applied.

In short, as the chief motive for recommending the use of a speculum is to avoid injuring the iris, during the incision of the cornea, it cannot too often be repeated, that this accident arises, more frequently, from the application, than from the disuse of such instruments. With a proper degree of attention there is no danger of wounding this membrane, even when the knife is entangled in it, if the operator only remember gently to press down the cornea with his finger, and pursue the incision without hesitation; but, in such a case, to withdraw the knife, in order to finish the incision by the application of the scissars, would be highly improper, and must carefully be guarded against[8].

I shall

[8] The Translator, for the most part, assents to what is advanced by the author in this section, in regard to the subject under immediate discussion. At the same time he must observe, that in some instances of children born with cataracts, he has been under the necessity of having recourse

I shall now adduce a few cases in support of the preceding observations.

CASE VIII.

Mons. ***, a physician at Droit, furnishes an instance of the convulsive eye, described in

course to the use of a speculum, in order to fix the eye; without the aid of which, he has found it totally impracticable to make the incision through the cornea with any degree of precision or safety. The speculum he has employed on such occasions, is an oval ring. The longest diameter of which is about twice as long as the diameter of the cornea, and the shortest about half as long again as this tunic. Annexed to the upper rim of the speculum is a rest, or shoulder, to support the upper eye-lid; and by its lower rim, it is fixed to a handle of such a length, and bent in such a way, as may render it convenient to be held in the hand of the operator. With an instrument of this shape, which he believes was first used by the late Mr. Else, he not long since fixed the right eye of a young lady, about fourteen years of age, which was remarkably unsteady, and extracted from it a solid cataract with great ease and success. About two years prior to this operation, a pulpy cataract had been extracted from the same young lady's left eye by a French oculist, who was then in Scotland; but the operation was extremely tedious, and afterwards the pupil unfortunately closed; so that, of course, the patient received no benefit from it.

the

the preceding section. He had a cataract extracted from the left eye, by an oculist at Paris, without success. My father, afterwards in the year 1784, performed a similar operation on the right eye. He at first simply divided the cornea, without attempting, at that time, to pierce the capsule of the cataract. This he afterwards accomplished with a sharp pointed golden instrument, in shape somewhat resembling a needle. The muscles both of the eye-lids and the globe of the eye were highly irritable; and, during the incision of the cornea, the aqueous humour escaped with so much rapidity, that the knife was totally enveloped in the projecting iris. My father, however, disengaged this membrane from the instrument, by gently rubbing his finger on it over the cornea; and he afterwards finished the operation without the smallest accident.

In this example, if my father's hand had been embarrassed by holding a speculum, it would have been impossible to avoid hurting the iris. It was, probably, the fear of this accident which prevented the oculist who performed the first operation

operation from making the incision of the cornea so large as it ought to have been. This I infer from an inspection of the cicatrix in the left eye. The difficulty with which the opaque crystalline came through so small a wound was, without doubt, the cause of the violent and destructive symptoms that followed. The operation which my father performed on the other eye was attended with no one disagreeable symptom, and at length was crowned with the fullest success.

CASE IX.

Madame ***, the muscles of whose eyes and eye-lids were strongly disposed to be convulsed on the slightest occasion, had a complete cataract in the left eye, which was operated upon some time past, by an oculist in Paris. The operation was followed by very severe symptoms, and, at length, after the patient had suffered the most excruciating pain, a suppuration took place

place in the eye. After all that I could collect from the account given me by the lady herself, and by those who were present at the operation, of the method in which it was performed, I conclude, that as soon as the incision of the cornea was commenced, the eye became convulsed, and the aqueous humour instantly escaped. Upon this, the vitreous humour, in consequence of the contraction of the straight muscles, came forward, and forced the iris upon the instrument; which, being thus entangled, the operator, perhaps unacquainted with the means of disengaging it, was obliged to make the section of the cornea too small in order to avoid wounding it. The efforts necessary to bring the cataract through this confined aperture, no doubt, excited a violent inflammation and pain; and these terminated in a suppuration, and consequent destruction of the whole globe of the eye. The extraction of the cataract from the right eye was performed by me. At the time of the operation this eye was convulsed for some minutes; but watching my opportunity when it was quite still, I made the incision through the cornea

without attempting, as in common cases, at that time, to puncture the capsule of the crystalline. Notwithstanding all the dispatch I could use, in this first part of the operation, my knife was quite entangled in the iris. I disengaged it, however, by rubbing the cornea in the manner I have before advised; and the section of the cornea was large enough to give a free passage to the cataract, after I had punctured the capsule of the crystalline by means of the golden needle. In fifteen days, the lady was perfectly cured, and was afterwards able to read even a small print.

After what has been stated, I have reason to believe, that if my right hand had been embarrassed by any instrument whatever, I should not have been able to disengage the iris from the knife; and, under a fear of wounding this membrane, it would have been very difficult for me to have made the incision in the cornea sufficiently large. In consequence of this, the great pressure I must have used to bring a large and firm crystalline through a small incision, would have excited a considerable inflamma-

tion,

cornea, the contraction of the muscles of the lids, and of the straight muscles of the eye, pressing on the vitreous humour, pushed the iris so far forwards against the knife, that the instrument seemed to be entirely enveloped by it; but, on my father's making a gentle friction on the cornea downward, this membrane quickly contracted, and left the edge of the knife free. The back of the knife being blunt, as I have already described it, any attention to the upper part of the iris, which pressed upon it was needless. When the section of the cornea was completed, the capsule of the crystalline was punctured with the gold needle; and afterwards, during the extraction of the cataract, the vitreous humour, which repeatedly pushed against the aperture of the cornea, was prevented from escaping by the upper lid, which was gradually closed, according as the cataract came through. This, though large, was extracted with tolerable ease. In a fortnight, the Princess was perfectly cured; and, at the end of a month, she could read the smallest characters with the help of proper glasses.

In

In this operation, the use of a speculum would have embarrassed my father's fingers, and much interfered with their free action in disengaging the iris from the knife. By the pressure it must have made on the eye, during the incision of the cornea, it would also, most probably, have forced out the cataract suddenly and with it a portion of the vitreous humour; a slight compression being often sufficient to rupture the membrane of the vitreous humour, when this body is voluminous, and when the muscles of the eye act powerfully upon it; and in some cases, even without a speculum, the contraction of the muscles of the eye is so strong, that unless the greatest care be taken to drop the upper lid, as the operator proceeds in dividing the cornea, the cataract, pushed forwards by the vitreous humour, will suddenly burst its capsule, and follow the instrument, together with a considerable portion of this humour. This is particularly to be apprehended in that species of the cataract, which I shall hereafter describe under the name of the hydatid cataract.

CASE

CASE XII.

The late Cardinal de Rohan, Bishop of Strasbourg was precisely in the same situation with the Princess de Rohan. It was extremely difficult to fix his eyes, which were instantly convulsed as soon as they were touched. My father, who had been sent for to Strasbourg to see the Princess Poniatouska, niece to the king of Poland, was consulted by the Cardinal, and entrusted with the care of the operation, which he accordingly performed upon the right eye, in the presence of many physicians of that city. The same difficulties occurred in this, as in the preceding case; and they were happily subdued by the same means. The only imperfection after the operation was a slight staphyloma, which remained a longer time than is usual. My father, being obliged to return to Paris, after three weeks stay at Strasbourg, and, convinced by long experience, that the air, and

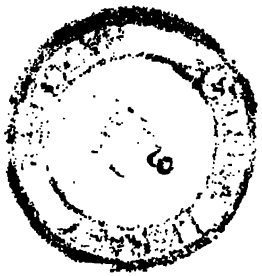
gentle frictions on the cornea, would soon reduce this hernia, advised the Cardinal to make no application to the eye on the account of it. But the person who attended, and who was entrusted with this direction, unwilling to appear wholly useless, applied compresses on the eye, and used a variety of other means; which, in fact, only tended to torment the patient, and to retard the reduction of the tumour. This, when all other applications were laid aside, took place of itself, as my father had predicted, and, in six weeks after the operation, the Cardinal was able to read with the assistance of glasses, as well as could be wished [9].

[9] It should be remembered, that the word, *staphyloma*, is used by authors, at different times, to denote two different diseases. One of these is a projection either of the whole, or of a part of the tunica cornea, and accompanied sometimes with a projection of part of the sclerotica also. The other, which is the disorder the Baron here means, is a protrusion either of an opaque or transparent membrane through an aperture in the substance of the cornea. When the protruded membrane is opaque, the disorder is always accompanied with an alteration in the figure of the pupil, and the tumour is evidently formed by the removal of a part of the iris from its natural situation. When, on the contrary, it is transparent, the French writers on this subject

ject usually call it, with Baron de Wenzel, a protrusion, or hernia, of the membrane of the aqueous humour. The Translator, however, having never been able to discover this membrane in the eye of any animal after death, is not yet satisfied with regard to its nature; and, he still doubts whether the transparent projection above mentioned, be any thing more than an inspissation of the substance, which is secreted through the sides of the divided cornea to form the connecting medium, and which is gradually stretched and pressed out by the aqueous humour behind it. It is not uncommon for this projection to appear after the operation of extracting the cataract. The Translator has met with it in several instances, and in some of these the operation has been performed by the Baron's father. But though exposure to the air, and frictions on the eye, have occasionally been sufficient to accomplish its reduction, as in the case here described, he has, in more than one instance, been obliged, in consequence of its long continuance, gently to touch its surface with the causticum lunare; immediately after the use of which, a few drops of water should be dropped into the eye, to prevent its influence from extending too far; and by this method, he has evidently hastened its reduction, and expedited the cure. This remedy, when applied in the gentle manner the Translator here recommends, produces no slough, and gives much less pain than might be imagined by those who are unaccustomed to its use on such occasions. The temporary inflammation which it excites, he believes to be of use, as it is accompanied with a contractile action in the morbid part, which tends to reduce it to its proper dimensions. It goes off in a short space of time, and, in general, the application may be repeated every second day, until the cure be completed. He does not mean, however, to confine its use to those cases in which the protruded part is transparent. He has

also

occasionally employed it with great advantage when the projection has been opaque, and was evidently formed by a part of the substance of the iris. See a case of this kind in his remarks on the Ophthalmy, &c. p. 82 of the second edition.



SECT. XIII.

On the Mode of performing the Operation in common Cases[1].

WHEN the patient is judged to be in a state fit for the operation, and has been duly prepared for it in the manner I have already described, let him be seated in a low chair, before a light which is not too bright and active. We have always observed that, in a moderate light, the patient is more calm and tranquil; and this is also favourable for the incision of the cornea, because it does not occasion too great a con-

[1] The Translator has given a title to this section agreeable to the literal meaning of the author's words. He cannot but be of opinion, however, upon a careful examination of its contents, that it would more properly be entitled—*On the mode of dividing the Cornea, and puncturing the Capsule of the Crystalline Humour, in common Cases.*

traction

traction of the pupil[z]. The sound eye being covered with a compress retained by a bandage, an assistant, placed behind, must hold the patient's head, and support it on his breast. With the

[z] I shall not here enter into an anatomical inquiry concerning the cause of the contraction of the pupil; nor shall I say any thing about the contracting and dilating muscles of the iris, the existence of which has been supposed by many anatomists. It appears to me much more probable, that the action of this membrane depends upon its vascular and nervous texture, and not upon any real muscular fibres, since these have never been perceived by the most celebrated anatomists. See, on this subject, Duverney (*a*), Morgagni (*b*), Mery (*c*), Winslow (*d*), Ferrein (*e*), Haller (*f*), Zinn (*g*), Warner (*h*), Porterfield (*i*), Senac (*k*), and Mauchart (*l*).

(*a*) Histoire de l'Academie des Sciences, 1678. p. 247, in 4to.

(*b*) Adversar. Anat. vi. Animadv. 69, 70. p. 227. Venetiis, in fol. 1762.

(*c*) Mem. de l'Acad. des Sciences, 1704. p. 261.

(*d*) Mem. de l'Acad. des Sciences, 1721. p. 318.

(*e*) Mem. de l'Acad. &c. 1741. p. 381.

(*f*) Herman Boerh. Prælect. Academ. vol. iv. p. 107. in 12mo. Leyden, 1758.

(*g*) Descript. Anat. Ocul. Human. p. 91. Gottingen, 1755.

(*h*) Description of the Human Eye, p. 67. London.

(*i*) A Treatise on the Eye, the Manner and Phænomena of Vision. Edinburgh, 1759, vol. i. p. 153. in 8vo.

(*k*) L'Anatomie d'Heister, avec des Essais de Physique, in 8vo. p. 692. Paris, 1735.

(*l*) Dissertat. de Mydriasi, seu pupillæ præter natur. dilatatione. Tubing. Mart. 1745. p. 52. sect. 26.

fore finger of the hand that is at liberty, he is then to raise the upper lid of the eye to be operated upon, and gently press the tarsus, with the extremity of the finger, against the upper edge of the orbit. In order to assist this arrangement, and properly to fix the upper lid, the assistant should take care to draw up the skin over the orbit, and strongly to fold the teguments that support the eye-brow. By this method, the eye will be entirely uncovered, an undue pressure upon it will be avoided, the fingers of the assistant will not interfere with those of the operator, and the eye lid will be so fixed, as to be incapable of any motion[3].

The operator is to be seated on a chair, a little higher than that of the patient. The eyes

[3] It is of importance, if possible, to procure an assistant, who is well acquainted with the operation, and even in the habit of performing it. Such a person alone is competent to follow the motions, and to accommodate himself to the wishes of the operator, by widening or closing the lids as circumstances may require, and, in a word, by executing the different movements which tend to aid and facilitate the progress of the operation. With the advantages of such an auxiliary, the difficulties of the operator will be greatly diminished, and he will often be preserved from much otherwise unavoidable, embarrassment.

natural

naturally turning towards the light, he is to place the patient's head obliquely to a window; so that the eye to be operated upon may be inclined towards the outer angle of the orbit. This position of the eye will enable the operator to bring out the knife, on the inner side of the cornea, opposite to the part where it pierces this tunic, more exactly than he would otherwise be able to do. The operator is to rest his right foot on a stool, placed near the patient, that his knee may be raised high enough to support the right elbow, and to bring the hand with which he holds the knife to a level with the eye on which he is to operate[4]. He is then to take the cornea knife in his right hand, if it be the left eye on which he is to operate, and, *vice versa*, in the left hand, if it be the right

[4] I have learnt from long experience, that this position, both of the operator and the patient, is preferable to any other that can be proposed. In the first place, the operator is seated perfectly at his ease, which, as surgeons well know, is essential to the right performance of every operation; and, in the next place, the position of the patient is better calculated than any other in which he can be placed, to prevent accidents during the operation.

eye.

eye. The knife is to be held like a pen in writing; and his hand is to rest steadily on the outer side of the eye, with the little finger, separated a little from the rest, on the edge of the orbit. In this position he is to wait, without any hurry to begin the incision, until the eye, which is usually very much agitated by the preparations for the operation, becomes perfectly still. This always takes place within a few seconds of time; and, therefore, as I have already fully expressed myself on this subject, every instrument invented to fix it, is useless.

When the eye is still, and so turned towards the outer angle of the orbit, that the inner and inferior part of the cornea, through which the point of the instrument is to come out, may be distinctly seen, the operator is to plunge the knife into the upper and outer part of this tunic, a quarter of a line distant from the sclerotica, in such a direction that it may pass obliquely from above, downwards, parallel to the plane of the iris. At the same time, the operator must depress the lower lid with his fore and middle fingers, which are to be kept a little distant one

from

from the other; and must take the greatest care to avoid all pressure on the globe, which is to be left perfectly free, as the surest way to diminish its power of moving[5].—See fig. 4. in the

[5] The Translator has so often perceived the ill effects of leaving the eye unfixed, while the incision is made through the cornea, that, for many years past, he has pursued, with no small degree of success, a method different from that here recommended by the Baron; and, as this is is a part of the operation highly necessary to its success, he begs leave to explain himself, by going into a minute detail of his ideas upon the subject. It should be remembered, that the danger likely to arise from undue pressure, can alone take place after the instrument has made an opening into the eye: and when the Translator recommends pressure as necessary to be employed, in order to fix the eye, he would be understood to mean, that this pressure should be removed the instant the knife is carried through the cornea, and before any attempt is made to divide this tunic downwards. But, to be more clearly understood, he would suppose the incision of the cornea to be divided into two distinct processes; of which the first may be called Punctuation, and the second, Section (*a*). So long as the knife, described in p. 77, fills up the aperture in which it is inserted, that is, until it has passed through both sides of the cornea, and its extremity has advanced some way beyond this tunic, the aqueous humour cannot be discharged, and pressure may

(*a*) See a similar description of this part of the operation, in a Dissertation on the Cataract, by the Translator's late partner, Mr. Wathen, p. 99, published in 1785, by Cadell.

be

the plate annexed, which represents the position of the knife, at the instant when it pierces the cornea.

When

be continued with safety. This part of the process, the punctuation of the cornea, being completed, the end and design of pressure is fully answered; and if it be continued when the second part of the process, or section of the cornea, begins, instead of serving any good purpose, it will most certainly produce effects of the worst kind. To avoid these, the Translator recommends the incision to be made through the cornea in the following manner.

The operator, being conveniently seated for operating, is to place the fore and middle finger of the left hand upon the tunica conjunctiva, just below, and a little on the inside of, the cornea. At the same time, the assistant, who supports the head, is to apply one, or, if the eye projects sufficiently, two of his fingers, upon the conjunctiva, a little on the inside and above the cornea. The fingers of the operator and assistant, thus opposed to each other, will fix the eye, and prevent the lids from closing. The point of the knife is to enter the cornea, on the side next the lesser angle of the orbit, a little above its transverse diameter, and immediately anterior to its connection with the sclerotica. Thus introduced, it is to be pushed on slowly, but steadily, without the least intermission, and in a straight direction, with its blade parallel to the iris, so as to pierce the cornea towards the inner angle of the eye, on the side opposite to that which it first entered and till about one third part of it is seen to emerge beyond the inner margin of the cornea. When the knife has reached so far, the punctuation, or that part of the operation which is preparatory to the section

When the point of the knife has proceeded so far as to be opposite to the pupil, it is to be dipped into this aperture, by a slight motion of the hand forward, in order to puncture the capsule of the crystalline[6]; and then, by another slight motion, contrary to the former, it must

section of the cornea, is completed. The broad part of the blade is now between the cornea and iris, and its cutting edge below the pupil, which, of consequence, is out of all danger of being wounded by it. As every degree of pressure must now be taken off the globe of the eye, the fingers, both of the operator and his assistant, are instantly to be removed from this part, and shifted to the eye-lids. These are to be kept asunder by gently pressing them against the edges of the orbit; and the eye is to be left entirely to the guidance of the knife, by which it may be raised, depressed, or drawn on either side, as shall be found necessary. The aqueous humour being now partly, if not entirely, evacuated, and the cornea, of course, rendered flaccid, the edge of the blade is to be pressed slowly downward, till it has cut its way out, and has separated a little more than half the cornea from the sclerotica, following the semicircular direction marked out by the attachment of the one to the other. And this completes the incision of the cornea.

[6] The Translator is of opinion, that this process of puncturing the capsule with the same instrument that is used for dividing the cornea, and at the same time, is rather a work of dexterity than usefulness; and, as it is often attended with much hazard of wounding the iris, he has not hitherto thought it advisable to adopt it.

be

be withdrawn from the pupil, and, passing through the anterior chamber, must be brought out near the inferior part of the cornea, a little inclined to the inner angle, and at the same distance from the sclerotica, as when it pierced the cornea above. If the knife has been well directed, and the fore and middle fingers of the hand opposite to that which holds the instrument, have been properly applied, the section of the cornea, thus completed, will be found sufficiently large; its shape will be semicircular; and it will be quite near enough to the margin of the sclerotica.

When the cornea is divided very close to the sclerotica, it not unfrequently happens, that a drop or two of blood escapes. This ought not to occasion alarm or uneasiness, since it generally proceeds from some of the blood-vessels of the conjunctiva, which lie close to the border of the cornea, and are divided at the same time with this coat. Such a slight local bleeding, far from doing harm, may prove very advantageous; and, for my own part, I am so fully persuaded

suaded of its use, that I always designedly make the incision of the cornea as near as possible to the sclerotica, on purpose to divide and unload these vessels. The discharge from them, though small, has a tendency to prevent an inflammation in the eye after the operation.

If the upper edge of the orbit be very prominent, and the eye small, and sunk deep in this cavity, it may be difficult for the operator to make the incision through the cornea so perpendicular as I have above recommended. Was he to attempt to introduce the knife in this direction, the prominence of the bone would oblige him to give the instrument a direction so oblique with respect to the plane of the iris, that it would be impossible for him to continue it onward, and to make the incision through the cornea sufficiently large. In this case, the knife must be held less perpendicularly; but, even here, it ought not to be passed in an horizontal direction.

In the eyes of some persons, the iris is convex. The anterior chamber, in such cases, is considerably diminished; and it becomes so

much the more difficult properly to complete the section of the cornea. It is indeed almost impossible to give it its due extent, without entangling the iris under the edge of the knife. Nor can the operator avoid wounding this membrane, unless he employ the frictions on the cornea, which I have so repeatedly recommended in this treatise, to disengage it. This convexity of the iris occurs most commonly in those cases where the crystalline assumes the form of an hydatid; but I have had occasion to remark the same circumstance, though the instances of it are very rare, where the crystalline has been in its natural state in point of size, and very nearly so in regard to transparency. I have also sometimes observed the same convexity in the iris, after the extraction of the opaque lens. In the greater number of instances, however, the iris is plain. Vesalius appears to have been the first who made this remark; and the fact has been fully confirmed by M. Petit, in the Memoirs of the Royal Academy for the years 1723, and 1728. Previous to the time of Vesalius, all anatomists, from

Galen downward, supposed the iris to be naturally convex.

The noise that is sometimes heard when the cornea is divided, and the difficulty that is experienced in making a section through this coat, have given occasion to persons who are little accustomed to perform this operation, to accuse the instrument they employ, and to suspect that its edge was not sufficiently keen. But this is wrong; for the cornea is sometimes so hard and tough, that the sharpest instrument cannot divide it without great difficulty. And the resistance I have frequently met in cutting through this coat has been so great, that I have been struck with the propriety of calling it *cornea*, from the near resemblance which, in point of toughness, it bears to horn. When it is found thus difficult to divide the cornea, it would be extremely improper to use force in pushing the instrument through it; and it is of equal importance to remember, that the practice of drawing the knife backward and forward, should be carefully avoided; since, by this method, there would be danger of finishing the

the section imperfectly, and making it too small. The instrument, on the contrary, should be steadily, but gently, pushed forwards in the direction that was at first given to it; and the nails of the fore and middle fingers may here prove useful, by supplying a resisting substance, on which the incision may be finished without a shock[7].

When the capsule of the crystalline humour is divided by the same process with which the section is made through the cornea, the incision forms a flap, which resembles that of the cornea, but upon a smaller scale. This mode

[7] The cornea, which is composed of many lamina, placed one over the other, may be completely separated from the margin of the sclerotica which surrounds it. On this account, some anatomists have been of opinion, that the cornea is only contiguous to the sclerotica, and not a continuation of it. When in a healthy state, it seems to be endowed with very little sensibility; but it becomes highly sensible when wounded with a sharp instrument, and much more so when punctured with one that is sharp pointed. Perhaps this sensibility of the cornea is chiefly owing to the conjunctiva that covers it; but whether it be the cornea or conjunctiva that is thus endowed with sensibility, in either case it must be evident that an injury to this membrane is far from being a matter of indifference.

of

of dividing it is attended with many advantages. It is more expeditious, performing that at once, which, according to other methods, requires two or three repeated efforts; and it fatigues the eye less, and is therefore less liable to bring on accidents after the operation. In fact, the eye is an organ so extremely delicate, that when it is much irritated, or suffers much pain, it is always in a state of danger; and when, notwithstanding these impediments to a cure, an operation proves successful, the success can only be attributed to the singularly happy constitution of the patient.

But the incision of the cornea is not the most difficult part of the operation. It afterwards requires much dexterity, as well as judgment, successfully to extract the cataract; and this dexterity is particularly necessary when the opacity of the crystalline is complicated with other morbid alterations in the state of the eye.

If the section of the cornea be made in the oblique manner I have above recommended, not only many inconveniences will be avoided, but many advantages will often be obtained.—

In

In the first place, the operator will escape the danger of unnecessarily wounding the adjacent parts, such as the caruncula lachrymalis, the angular vein, the nose, and the tunica-conjunctiva. These accidents are very likely to happen when the incision is made horizontally; that is, in a line with the great and small angles of the eye; and more especially in those cases where the eye is drawn inward, which is frequently the case, when the patient is much agitated.—In the next place, by this mode of making the section through the cornea, the operator will prevent the too hasty effusion of the aqueous humour. This is an important point, since, whenever it happens, the iris, getting before the edge of the knife, is in danger of enveloping it; and in this case, unless the mode of liberating it which I have indicated, by gently rubbing the cornea, be adopted, it is almost impossible to avoid wounding this membrane[8].—Again, by this

[8] The premature effusion of the aqueous humour during the punctuation of the cornea is so dangerous an accident, that no means, which have any tendency to prevent it, should

this mode of operating, the incision of the cornea may be made larger than by any other, and the passage of the crystalline through the incision being hereby facilitated, the irritation, which a difficulty in extracting it might occasion, will be avoided.—But another, and one of the greatest advantages arising from this oblique mode of making the incision through the cornea, is, that the wound will afterwards be nearly covered by the upper eye-lid; and its lips being

should be neglected. The Translator, however, is not certain that the oblique introduction of the knife will make any difference in this respect. The due retention of the aqueous humour in the eye appears to him to depend principally, if not entirely, first, on the goodness of the knife, which, like a wedge, should accurately increase in breadth and thickness all the way from the point to the handle; and, secondly, on the steadiness with which it is passed from one side of the cornea to the other. If, notwithstanding an attention to these circumstances, such an accident prematurely take place, (that is, before the cutting edge of the knife has passed below the lower margin of the pupil) and, in consequence of it, the iris become entangled by the edge of the instrument, it may often be readily disengaged in the manner our author recommends, by gently rubbing the cornea downward with the point of the finger; and this the Translator believes to be one of the most important directions in the Baron's whole book.

thus kept in close contact, their re-union will be promoted, the cicatrix be made less apparent, and the danger of a staphyloma after the operation be diminished. When, on the contrary, the section of the cornea is made horizontally, if the upper lid becomes swelled, it will press against the superior part of the cornea, and retract or elevate the upper lip of the wound. And if, at the same time, the lower lid press the inferior lip of the wound inward, it will separate this lip still further from the superior, and often insinuate itself into the intermediate space. The air, also, getting between the lips of the wound, will dry them, render them callous, impede their re-union, and consequently deform the cicatrix, and produce a train of accidents, which too often terminate in a staphyloma.—The last advantage I shall mention, as arising from this oblique mode of dividing the cornea, is, that the vitreous humour is less likely to escape through a wound thus made, than when the incision is made horizontally.

SECT.

SECT. XIV.

On a Mode of opening the Capsule, necessary in some particular Cases.

NOtwithstanding the advice I have given in the last section, to puncture the capsule of the crystalline humour with the same instrument, and at the same time that the incision is made through the cornea, yet this part of the operation cannot always be accomplished in this manner, without hazarding the sight, by keeping the instrument too long in the eye. In such cases, therefore, it is advisable to pursue the incision of the cornea separately, and to leave the capsule to be opened afterwards, in the way I shall presently direct. By this method, the aqueous humour will be prevented from escaping too rapidly, and the iris from being entangled by the edge of the knife. My father's success in the following case must be

attributed to his attention to this circumstance.

CASE XIII.

Madame Rood, who lived under the Exchange at Amsterdam, had been long afflicted with a cataract in the left eye; and in the year 1761, my father extracted it in the presence of Messrs. Camper and Hovius, two celebrated Dutch physicians. The eye projected but little, the cornea was not very large, and the pupil possessed but a small degree of motion. The crystalline was very opaque, and the anterior part of its capsule was white, like a piece of paper, and adhered to the edge of the iris. As soon as the knife had pierced the cornea, and was dipped into the pupil, in order to divide the capsule, my father saw with surprize that the point of the instrument, although very sharp, instead of cutting through this membrane, slipped over it, as it would have done

over tough leather. Under such a circumstance, it would have been dangerous to persist longer in the attempt to puncture it in this manner, because the aqueous humour would have escaped, and the iris would have entangled the knife. Though these accidents might not have been attended with any great inconvenience, it was certainly better to avoid them. Besides, the point of the instrument, in the different movements necessary to puncture the capsule, might have been hitched in the iris, and might unavoidably have wounded it. My father, therefore, withdrew the instrument from the capsule, and pursued the section of the cornea only; which, being finished, he afterwards not only divided but destroyed the anterior part of the capsule, with a needle contrived for this purpose, by moving it about in different directions. This part of the operation was both tedious and painful, on account of the toughness of the capsule, and its adherence to the iris. Being, at length, however, accomplished with the greatest care, which was indispensably necessary on account of its being opaque, the next object

object that called for attention was to extract the crystalline itself; but this did not give way to the gentle pressure that is usually found sufficient to dislodge it. Its upper edge repeatedly advanced in the pupil, and sometimes came almost through it; but its lower edge adhering to the posterior part of the capsule, and the capsule itself closely adhering to the membrane of the vitreous humour, it could not be made, without undue pressure, to advance any further. Every time the crystalline advanced, a small bladder was perceived on its posterior and inferior edge, strongly adherent to it, and formed by the hyaloid membrane[9]. My father, seeing this, signified to Messrs. Camper and Hovius, that a part of the vitreous humour would unavoidably escape. He then twisted

[9] By the hyaloid membrane is meant the tunic of the vitreous humour. This tunic is generally described as divisible into two parts; the external of which, properly speaking, is the tunica hyaloidœa; the internal, means a number of processes, or elongations, arising from the external, which pass in different directions through the humour, and form a series of cells, like those in a honeycomb, which serve to support this humour.

the

the crystalline quite round, and thus destroying its adhesion, effected the complete extraction of it. The posterior part of the capsule was opaque, and came out adherent to the crystalline; and in the middle of this opaque part of the capsule, that fragment of the membrane of the vitreous humour was perceived, which formed the small bladder above described. Notwithstanding the upper lid was instantly closed, upon the extraction of the crystalline, there was a considerable effusion of the vitreous humour, as was foreseen. The lady suffered no pain afterwards, and though the operation was both intricate and tedious, it was followed neither by an inflammation nor staphyloma, and, in the usual time, the sight of this eye was perfectly restored.

CASE XIV.

Mademoiselle Mariner, in la Ruë de la Verrerie, upon whom I operated in the year 1784, presented an instance of the same toughness in the

the capsule, and the same resistance to the point of the instrument, in attempting to puncture it, as that which I have just described. The colour of the capsule, which was white, and extremely vivid, the long continuance of the disorder, and especially, the extreme agitation of the patient, determined me to postpone the attempt to puncture it, until I had finished the section of the cornea. It should be mentioned that this lady had very prominent eyes, and her pupils were much contracted, though capable of a small change in size when exposed to different degrees of light. Having happily completed the section of each cornea, notwithstanding the difficulty of fixing the eyes, my next object was to divide the capsules. I began with that of the left eye; but having introduced a gold sharp-pointed needle for this purpose, and having worked it about in different directions, I could not cut through this membrane. I therefore relinquished the use of this instrument, being afraid that the pressure I might make with it, though gentle, should lacerate the posterior part of the capsule, tear

the hyaloid membrane, and plunge the crystalline deeper in the vitreous humour. Instead of the gold needle, I substituted a small sharp-pointed instrument, shaped like a hook, with the sharp end of which I hitched the anterior portion of the capsule, and, by gently moving the instrument about, detached it from its circumference. In this way, the anterior portion was brought away almost entire; which being accomplished, I proceeded to extract the cataract. The same phenomenon here presented itself, as in the preceding case. More than half the crystalline came through the pupil, but the remainder was kept back by an adhesion of its posterior and inferior part, upon which a small bladder was perceptible, formed by the hyaloid membrane. I several times compressed the eye, in order to dislodge the cataract; and, each time, almost the whole of it came through; but, in consequence of its attachment by the bladder above-mentioned, it always retreated again, as soon as the pressure was discontinued. I availed myself of my father's example in the former case, and intimated to a friend of the

the patient who was present at the operation, that a part of the vitreous humour would unavoidably escape; after which I twisted the crystalline round on itself, when the bladder burst, and the cataract came out of the eye, bringing with it a portion of the vitreous humour. The quantity of this humour that escaped was, however, less than I expected, in consequence of the quickness with which the eyelids were closed, and a compress and bandage applied. These were continued on the left eye, whilst I proceeded to extract the cataract from the right. I did not attempt to divide the capsule of this eye with the gold needle; but, as soon as the section of the cornea was completed, I at once introduced the same small instrument, shaped like a hook, which I had employed in operating on the left eye. With this I divided the capsule in different directions, and found it extremely tough. I could not remove it in one entire piece, as I had done in operating on the left eye, but I took it away in fragments, by means of a small forceps, before I attempted to extract the cataract. In extracting this body, I found the

the same sort of adhesion to the hyaloid membrane as in the other eye, but less considerable; and so, likewise, was the effusion of the vitreous humour, which followed the cataract.

Having applied the proper dressings, the patient was put to bed, with her head in a very low position. Both her eyes were painful for some days, and particularly the left eye, which had principally suffered during the operation. She was repeatedly blooded, and took many cooling and diluting medicines. When I opened the eyes at the usual time after the operation, she distinguished all objects tolerably well, but less perfectly with the left eye than with the right. Upon examination, I perceived a slight confusion both in the aqueous humour and in the cornea of the former; and the iris had a pale green colour, which inclined me to fear that an hypopion would follow. To prevent this disease, I bled her in the foot, prescribed a very exact regimen, and applied a large blister. The use of these remedies was attended with success; the eye grew better and better every day; and after some months, notwithstanding the

loss of the vitreous humour, and all the obstacles that intervened, the patient was able to read with the assistance of proper glasses.

It sometimes happens, that the anterior portion of the capsule of the crystalline is opaque, as well as the crystalline itself. This kind of complicated cataract may be distinguished by the appearance of points or spots, whiter and larger on one part of the cataract than on another. These spots may, indeed, be perceived in the crystalline, when there is no disorder in the capsule; but then they lie deeper in the eye; whereas opacities in the capsule not only appear more forward, but seem as if they were detached from the crystalline; an opacity of which humour, when other parts of the eye are undiseased, is, in general, uniformly white; and if the anterior part of the capsule is at the same time, opaque, the opacity exactly covers or fills up the aperture of the pupil. In this case the following mode of operation is the most likely to prove successful.

After having completed the section of the cornea, the anterior portion of the capsule is not

not to be divided in the manner I have recommended in common cases. Instead of the instrument described above, a small forceps[1] must be introduced through the pupil, and a portion of the capsule must be gently laid hold of with its extremities. The capsule is then to be regularly separated round the whole circumference, from the adhesions it may have formed with the parts which surround it; and, in this manner, may be taken out entire. This method has never been attended with any great inconveniences in those cases which have fallen within the course of my practice. The anterior capsule being taken away, the crystalline itself is then to be extracted; but if this body were first to be removed, it would be extremely difficult afterwards to take away the opaque capsule, without lacerating the hyaloid membrane, and thus giving vent to the vitreous humour. Besides, there could in this case be no certainty of removing the anterior part of the capsule so perfectly as that some portions of it should not

[1] See the shape of this forceps in fig. 11.

remain

remain behind, which would prove injurious to the sight. By the process above mentioned, the fore part of the capsule is the more easily removed, because the crystalline, while it remains in the eye, serves as a support, by means of which the capsule is more effectually seized; and because there is, in this case, no danger of tearing the membrane of the vitreous humour, to which some fragments of the capsule will unavoidably adhere, when the crystalline is first extracted.

CASE XV.

Mons. de Montgirod, a merchant of Lyons, came to Paris in the year 1784, and soon after his arrival, consulted me on account of two cataracts. That of the right eye was complete, and moreover discovered symptoms of an opacity in the anterior portion of its capsule. The left eye did not seem to be affected with the same kind of complex disease. The patient having determined to submit to the operation

on

on both eyes, I began with the left eye, in which the crystalline alone appeared to be opaque. I made the incision of the capsule at the same time with that of the cornea; and then, instead of immediately extracting the crystalline, I proceeded to operate upon the other eye[2] the cornea of which I divided by itself, that I might be able afterwards to take out the capsule entire, in the manner I have recommended in this section. I then extracted the cataract from the left eye; after which, perceiving, contrary to my expectation, that some portions of this capsule, which I had divided with the cornea, were manifestly opaque, I was obliged to introduce

[2] When the right and left eyes are to be operated upon at the same time, we always make the section of both corneas before we terminate the operation in either; which practice we have found to succeed better than that of finishing the extraction of one cataract, before the operation is begun on the other. In this way the patient is always more firm and tranquil. Whereas, on the contrary, when he is permitted to see objects with one eye before the operation is begun in the other eye, his spirits are always much agitated, he becomes less tractable; and though care be taken to bind up the eye that has been operated upon, yet both eyes become highly irritable, in consequence of the sympathy that subsists between them.

the

the forceps, and extract them one after the other. I found great difficulty in doing this, and was much afraid, lest, in accomplishing it, I should divide the hyaloid membrane, to which some of these portions adhered; and, notwithstanding all my care and precaution, a small quantity of the vitreous humour escaped during this difficult operation. When it was finished, however, the patient saw tolerably well, though the pupil was unavoidably a little deformed. The right eye gave me much less trouble, because I was prepared for what might happen. The fore part of the capsule being undivided, and receiving support from the crystalline behind it, I was able more readily to lay hold of it with the forceps, and, by gently moving it in various directions, I detached it round its circumference, and immediately extracted it. The crystalline afterwards came through without any difficulty, and the operation was soon happily terminated. The patient suffered pain only in the left eye; and this was occasioned, without doubt, by the slight efforts I was obliged to make with the forceps, in order to bring away

the

the opaque capsule. But notwithstanding this, upon his return to Lyons, he enjoyed almost as good a sight in this eye as in the other, which underwent no pain whatever after the time of the operation.

CASE XVI.

Madame Harvey, a tobacconist, at Chalons sur Marne, presented a complicated case similar to the preceding. She had a cataract in the right eye, combined with an opacity in the anterior portion of the capsule, as appeared by the white spots and inequalities, of which I have spoken above, in the surface of the crystalline. Her left eye was sound. I operated on the right eye in the year 1782. After the section of the cornea was completed, I detached the anterior portion of the capsule with the forceps, and, without injury, took it away entire. The crystalline afterwards came out easily. The patient suffered some pain in consequence of the operation, but it was soon removed by

bleeding her in the foot; and, notwithstanding this obstacle, the sight was soon recovered to as great a degree of perfection as was possible after such an operation.

In cases where the pupil is much contracted, as well as in those where the muscles of the eye and the eye-lids are easily thrown into convulsions at the approach of an instrument, it is improper to puncture the capsule at the same time that the section is made through the cornea. This is likewise improper, where the space between the crystalline and the iris[3], which is usually called the posterior chamber of the aqueous humour, appears to be large. In all such cases, it is more advisable simply to divide the cornea in the first instance, and then to

[3] Though the space between the iris and the crystalline is sometimes considerable, it is, at other times, so small, that the opaque crystalline appears to touch the iris; and, no doubt, it was this circumstance that led Winslow, and some other celebrated anatomists, to doubt the existence of this posterior chamber of the aqueous humour. See Winslow's Expos. Anatom. p. 317. Paris, 1721; Senac. Anat. d'Heister, p. 693, &c. Paris, 1735. Lieutaud, Essais Anatomiques, p. 128, 131, &c.

puncture

puncture the capsule with a different instrument; by which means the danger of wounding the iris with the cornea knife will be very much obviated.

The instrument we employ in such cases, for the purpose of puncturing the capsule, is a flat needle, one line, that is, one-twelfth part of an inch, in diameter, having its cutting extremity a little incurvated[4]. This needle, which should be made of nealed gold, that, being pliable, the operator may be able to bend it in different directions, as occasion requires, is fixed in a handle, two inches and a half in length, and similar to that of the cornea knife. At the other extremity of the same handle, a small curette or scoop is fixed, made also of nealed gold, which is of use to extract the cataract (see fig. 9.). The needle and curette being thus fixed in the same handle, may each of them be used accord-

[4] When the capsule is hard and tough, the flat needle here described is sometimes found insufficient to pierce and destroy it; and in such cases there is a necessity to substitute in its place a sharper instrument, but shaped nearly in a similar manner. See fig. 10.

ing to the circumstances of the operation, without any further trouble or interruption, than merely turning the instrument in the hand.

The flat needle is also of great use to dilate the pupil, in cases where this aperture is too much contracted, and the crystalline very bulky. Its sides being blunt, it may be introduced through the pupil, without any danger of wounding the iris; and in this and other respects it is much superior to the *cystitome* of La Faye. But the dilatation of the pupil, which this instrumeut is capable of producing, is not always sufficient to answer the purpose; and when the pupil has been much contracted, I have sometimes been obliged to enlarge its aperture, by dividing the iris with a pair of scissars. This operation is less dangerous than the extension of the fibres of the iris, occasioned by a very large crystalline passing through it.—The following cases are adduced in proof of this assertion.

CASE

CASE XVII.

In the year 1783, a woman was brought to me, from Fontenay sur Bois, who had a complete cataract in the left eye, and an incipient one in the right. On examining her eyes, I found that the pupils dilated and contracted very feebly, and were so much reduced in size, that they could scarcely admit the head of a pin[5]. These circumstances rendered it impossible to puncture the capsule at the same time that the section was made through the cornea. I therefore divided the cornea in the first place; and, afterwards, according to the process I have already stated, introduced the flat needle, just now described, into the pupil; and there, moving it in different directions, I not only punc-

[5] It might be imagined, that this contraction of the pupil would render it very difficult to discover an opacity in the crystalline humour. But I can assure the reader, that, with very little attention, the alteration in the structure either of this body, or of its capsule, may easily be perceived.

tured

tured the capsule, but dilated the pupil both upward and downward, and to the right side and left. Then, by a slight pressure on the upper part of the globe of the eye, I brought the upper edge of the crystalline to shew itself through the pupil; but this aperture was so much contracted, that it afterwards required a considerable time to enlarge it as much as was necessary, in order to make room for the crystalline to pass through it. At last, when about a quarter part of it had made its way through the pupil, as it did not readily advance further, I was obliged to disengage it from the iris by means of the curette, with which I turned the crystalline quite round on itself, and then extracted it.

From this case we may collect how essential it always is to make a large incision through the cornea, in order to give the pupil sufficient room to dilate with ease. There is no reason, under these circumstances, to apprehend a staphyloma, as has been supposed by some authors. I have observed, on the contrary, that the wound has healed with less difficulty, and staphylomas have been less frequent, when the

section

section of the cornea has been thus large, than when it has been small; and, if the section be made in the oblique manner I have above directed, it will be completely covered by the upper lid; so that a hernia of the iris cannot take place in consequence of it, nor can the edge of the lower lid easily insinuate itself between the lips of the wound, so as to prevent their union[6]; which accidents it is very difficult to avoid, when the incision is made horizontally.

The woman, in the case just stated, was cured in a very few days. The pupil continued but little more dilated after the operation than it did before, and its power of motion was increased but in a very small degree. The sight of this eye was, however, as good as I had any reason to think it could be after such an ope-

[6] The failure of the operation of extracting the cataract, is often owing to the smallness of the incision made through the cornea. The obstacles the crystalline meets with in coming through this aperture, produce inflammation, suppuration in the eye, pain, opacity in the cornea, and many other accidents, which would happen less frequently, even if a wound were made through the iris.

ration. The following year, I performed a like operation upon the other eye, and under very much the same circumstances.

CASE XVIII.

In the year 1768, my father being in London, Mrs. Pitt brought to him a lady who lived with her as a companion, and who had a cataract in each eye. After a careful examination, he was of opinion, that the capsules of both crystallines were opaque, and adhered to the iris. These circumstances were so unfavourable, that he gave the lady no encouragement to expect relief from the operation: and indeed was not prevailed upon to undertake it without the most earnest solicitation. He then desired that some persons might be present, who were able to judge of the critical nature of the case. Messrs. Sharp and Gataker, surgeons to the Royal Family, were accordingly proposed by Mrs. Pitt; and in their presence the operation was performed.

ed. After having divided the cornea of both eyes in the usual manner, my father introduced the gold needle, to puncture the capsules of the crystallines; which part of the operation he dared not attempt with the cornea knife, on account of the contraction of the pupils. With this needle he enlarged the pupils, and separated the adhesion between the capsules and the iris; after which, by gently pressing on the upper part of the globe, the crystallines came through, and with them their anterior capsules, which were opaque, and adherent to them, and had been very slightly, if at all, wounded by the needle. The iris, which protruded through the wound in the cornea, as the cataract came out, was pushed back, and replaced, by means of the curette. As soon as the operation was finished, the lady perceived distinctly every thing that was placed before her; and, after a short time, was perfectly cured, without suffering any inconvenience either from pain or inflammation. The pupils remained still immovable; but they were nearly round in figure, and

not

not so much contracted as before the extraction of the cataracts.

This operation was attended with a degree of success much beyond what might have been expected from the state of the patient. In describing it, I have particularly noticed the protrusion of the iris through the aperture in the cornea, after the cataract was extracted. This accident, which might in all probability have been the cause of a staphyloma, is not unfrequent, when the iris is relaxed, and the pupil much stretched by the passage of a large crystalline through it. I shall have occasion to speak of it again in another part of this treatise.

SECT.

SECT. XV.

Upon the Section of the Cornea.

IN making the section through the cornea, the fore and middle fingers of the hand opposite to that which holds the knife, are found highly useful to render the incision round, and to give it its proper extent and direction. The nail often affords a necessary support to the edge of the instrument, directing it downward and outward, after its point is come through the inner side of the cornea. See fig. 5. From hence, therefore, it may be conceived to be of the utmost consequence that these fingers should not be embarrassed by any instrument. And when the incision is begun, it should be steadily pursued through the cornea, without turning the edge of the knife forward or downward, as inexperienced operators are sometimes apt to think

think necessary, in order to finish the section more speedily.

It is also a matter of importance, that the knife be held lightly between the fingers, and that no violent efforts be used in making the incision.

If, in consequence of the operator's inattention, the edge of the knife incline too much forwards, and its direction be not changed, the incision through the cornea will be made too small, and will terminate almost opposite to the pupil. In this case, there will be great difficulty in extracting the cataract[7]; and afterwards

[7] The Translator has, more than once, seen operators embarrassed in consequence of their inattention to this circumstance. Under an apprehension of wounding the iris, they have introduced and brought out the instrument at a considerable distance anterior to the line of union between the cornea and sclerotica, in consequence of which, the incision from one side of the cornea to the other has been made too small to allow the easy extraction of the cataract, although, from above, downward, it was fully competent to answer this purpose. The Translator has also sometimes seen, that though the punctuation of the cornea, from side to side has been properly conducted, and its section, afterwards, to all appearance, effectually completed, yet, by reason of the frictions that were employed to disengage

wards the cicatrix will often prove an impediment to the patient's sight. If, on the contrary, the edge of the instrument be inclined too much backward, and its direction remain unaltered, the incision will approach too near the part where the iris and sclerotica unite, and there will be great danger of wounding one or the other of these coats of the eye. Both these accidents are injurious, and may be prevented by gently rolling the instrument between the fingers, until its blade assumes its proper direction.

When the knife has pierced both sides of the cornea, though its point may have passed through on the side of the great angle, for the space only of half a line, yet the eye is hereby

gage the iris from the edge of the instrument, the knife, in cutting its way downward, has been carried between the lamina of the cornea, and consequently, though the incision has appeared externally to be of its proper size, internally it has been much too small, which has, therefore, occasioned the operator much trouble in bringing the cataract through it. When this is known to be the cause of the difficulty, the remedy is manifest. The incision must be enlarged; and this will be most effectually done by means of a pair of curved blunt-pointed scissars, which should be introduced on the outer side of the cornea, in the part where the point of the knife entered this tunic.

fixed;

fixed; and if it should afterwards incline further toward the great angle, it may easily be brought back, and the incision be finished in the manner I have above directed.

Though it is very desirable, in every instance, to make a large incision through the cornea, and, as much as possible, to prevent the wound from lying opposite to the pupil, yet cases sometimes occur, in which it is not easy to accomplish this design, either on account of the largeness, or of the flaccidity of this tunic. Under these circumstances, though the knife, even in the broadest part of it, be carried through the cornea, yet, a considerable part of this tunic will still remain undivided. I have known this to be the case, especially in those instances where the patient has been very timid, and has borne the operation impatiently. To prevent such an inconvenience, the operator should always have in readiness knives of a different breadth; and, before he begins an operation, he should compare them as nearly as possible, with the dimensions of the cornea, taking care that they be wide enough in the diameter of the blade to complete

complete the section of this tunic, and to make it as large as may be necessary. If, however, this precaution has not been attended to, and if, when the instrument has passed through the cornea to its broadest part, there still remains a portion of this coat to be divided, the defect must be remedied, and the incision carried on, by withdrawing the knife on the side towards the small angle of the orbit of the eye, and, at the same time, gently lowering or pressing down the point of it. By this process, the incision will be enlarged and completed, the instrument will be brought out, as near as possible, to the lower margin of the cornea, and the roundness of the section be preserved. See the shape of it in fig. 6. The assistant, to whose care the upper lid is entrusted, is gradually to let it drop, after the knife has pierced through the cornea, and as it cuts its way downward, in order to prevent the cataract from escaping too hastily; and then the whole charge of the eye devolves solely on the operator, who is to solicit the extraction of the cataract by gentle pressure on the upper part of the globe.

When the crystalline, thus dislodged from its capsule, protrudes itself through the aperture in the cornea, its removal from the eye may sometimes be assisted by the use of the needle above described; and, afterwards, the opaque and glutinous matter, which frequently accompanies the cataract, and is produced by the dissolution of a part of its substance, must be removed with the greatest care, by means of the curette.

It is always advisable, after the operation, gently to rub the anterior part of the cornea, over the lids, either with the thumb or the curette. This process usually collects in the center of the pupil some small fragments of opaque matter, which the crystalline leaves behind it; and which, if not taken away with the curette, might escape notice, and give rise to a particular kind of secondary cataract, which I shall describe more fully in a future section.

The curette is of use, also, to replace the iris; some portion of which membrane occasionally comes through the incision in the cornea, and especially after the extraction of a

large cataract. The deformity in the figure of the pupil, which the inclosure of a part of the iris in the cicatrix of the cornea unavoidably produces, will hereby be prevented.

SECT. XVI.

Upon the Extraction of the Adherent Cataract.

IT happens, not unfrequently, in cataracts which have been long formed, that the crystalline does not readily escape through the section of the cornea; not yielding to the gentle pressure recommended in the last section. In such cases, the adhesions that retain it, and obstruct its passage, must be separated by means of the golden needle above recommended; which is to be introduced under the cornea, and applied in different directions, according as the case requires, and, more especially, round the circumference of the crystalline. This method we have always practised with success; and I think it my duty to establish it, as far as I am able, by stating some very remarkable cases.

CASE

CASE XIX.

M. Monsigny, well known for his musical talents, had a cataract in the right eye, the pupil of which was almost motionless. In the year 1784 my father operated on this eye, in the presence of M. Imbert, surgeon to the Duke de Chartres. After the cornea and capsule had been properly divided, my father found that the cataract did not come through the wound on his making the usual pressure. He was therefore obliged to introduce the needle, and to carry it in different directions round the crystalline, in order to destroy the adhesions it had formed to the posterior parts of the iris. This part of the operation took up at least fifteen minutes. After which the crystalline came out, but slowly, and with some difficulty; bringing with it a part of the anterior capsule, on which were several dark-coloured streaks. These were produced by vessels that were detached

from the posterior surface of the iris, and which remained still adherent to it.

Notwithstanding the length of the operation, and the fatigue which the eye necessarily underwent, the patient experienced no further accident than an acute pain in the eye, which was soon mitigated by bleeding in the foot. His sight became as good as it usually is, after the most favourable operation, and the pupil returned to its natural state.

CASE XX.

M. Richer, an old officer in the *Chambre des Comptes*, had had a cataract in each eye for many years; and, in the year 1785, submitted to the operation. The cataract in the right eye had been formed some time before the other; and both were in a continued convulsive motion, which rendered it very difficult properly to make the section of the cornea. This was, however, at length completed with perfect safety,

safety, but without attempting, till afterwards, to puncture the capsule. The iris in each eye came forwards, and entirely enveloped the knife, but was disengaged from it by gently rubbing the anterior part of the cornea with the finger. The chief difficulty occurred in introducing the needle to puncture the capsule; and this arose from the perpetual motion of the eye, which rendered it still more embarrassing to destroy the adhesions of the right cataract. This was a case that required a patient and steady perseverance. It might be supposed by some, that a speculum oculi would here have been of use; but, under the present circumstances, more than others, I am of opinion this instrument would have been detrimental, as it would have increased the irritation of the eye, and, by its undue pressure, would, probably, have forced out the vitreous humour. At last, after many attempts, the capsules of both eyes were divided, and their adhesions destroyed. The cataracts came out slowly, and brought with them a part of their anterior capsules; on the circumferences of which several black streaks appeared,

appeared, which were the terminations of some of the ciliary processes adherent to it; a circumstance which occasionally takes place, when the eye is in a diseased state. Upon the crystalline of the right eye they were perceived at regular distances, parallel to one another, and extending nearly to its most convex part. As the adhesion in this eye was most considerable, and the motion of the pupil most confined, it appeared to us more than probable that these streaks were vascular fibres, separated from the posterior surface of the iris, to which it was evident, the capsule which came away with the crystalline also adhered [8].

Notwithstanding

[8] The circumstances of this case, which is not an uncommon one, may be thought to give weight to the opinion of those anatomists, who believe the ciliary processes to be inserted into the capsule of the crystalline humour. But, since these black filaments are observed only when the eye is in a diseased state; and since the most celebrated anatomists have never been able to discover their insertion in this manner in a healthy eye, and deny their supposed use, in bringing the crystalline nearer to the pupil, or carrying it further from it, according as the object is at a greater or a smaller distance from the eye, is it not more probable that the union of these parts, whenever it takes place, is the effect of disease, and that, in their natural state, they

Notwithstanding the complications above described, and the various difficulties which unavoidably protracted the operation to a tedious length, the patient recovered his sight; nor did he suffer any degree of inflammation, nor, which is still more remarkable, any pain.

CASE XXI.

M. Cleret, an old comptroller of the King's household, upon whom I operated in presence of my colleague, M. Mathey, presented another case of these rare complications in both eyes. The cataract in the left eye was of more than twelve years continuance; that in the right was more recent. Both eyes were extremely irritable, and habitually watery, and the eye-lids were swelled, and slightly œdematous.

they are always separate? Consult, on this subject, Haller, Heister, Camper, Cassebohm, Zinn, M. Sabatier, &c. who are of the latter opinion; and Morgagny, Bidloo, Porterfield, Jurin, Smith, &c. who think, on the contrary, that the ciliary processes are thus attached to the crystalline capsule, and destined to the use suggested above.

But,

But, notwithstanding these disagreeable circumstances, together with an adhesion of the crystalline, which I also suspected, the eyes appeared to be in a state which afforded hopes of success from an operation. I therefore undertook it. The agitation in which I found the patient, and the continual and almost convulsive motion of the eyes, determined me to make the section of the cornea only in the first incision. This process was speedily accomplished; yet, before it was finished in both eyes, the patient became sick, and I did not attempt to proceed until he was perfectly recovered[9]. After the short delay which

[9] Some persons have a disposition to vomit, either when they go into a fainting fit, or when they recover from it. When, therefore, a patient faints during the operation, it is always advisable to wait until he be quite recovered, before the operation be pursued. This may prevent a derangement of the interior parts of the eye, and a consequent extravasation of the vitreous humour; which accidents are not so likely to happen whilst the crystalline remains in its place, because this serves as a kind of support to the other parts of the eye. The dangerous effects produced by vomiting under the operation I have frequently seen exemplified; and, in particular, in the case of a woman who was attacked in this manner immediately after I had extracted a cataract from one of her eyes. I was obliged to wait

which this circumstance occasioned, I divided the capsules of the crystalline with the needle; after which, as the cataracts did not come through upon my applying the usual gentle pressure with my finger on the upper part of the globe of the eye, and with the curette on the lower, I was confirmed in my opinion that the crystallines adhered. I therefore destroyed these adhesions with the needle, and afterwards extracted the cataracts. They came through with some difficulty; and round their circumference some black vessels appeared, similar to those I have described in the last two cases. The number of these was most considerable on the lower part of the rim of the crystalline, in the left eye, in which the disease had prevailed for the greatest length of time; and this crystalline, together with a part of the capsule that adhered to it, came out in a manner that is not

wait till she came to herself before I proceeded to extract the other lens; and, notwithstanding I had equal reason to hope for success in both eyes, I succeeded only with the last; the violence of retching having caused, in the first eye, and extravasation of the vitreous humour, and, in consequence of this, a total loss of sight.

usual, with its upper edge foremost. I afterwards removed some loose portions of the crystalline which remained in the pupil, and, when satisfied that they were all taken away, I bound up the eyes in the usual manner, with a compress and bandage.

The day after the operation, perceiving that the eye-lids were swoln, I took away the compresses, and left only the bandage tied loosely over the eyes. I had no apprehensions lest the patient should open his eyes; because, on account of the swelling of the lids, he could not do it without much difficulty. On the third day, I removed the bandage also, and left the eyes quite at liberty, only giving directions that the window shutters of the patient's room should be kept close shut. This method happily succeeded. The action of the air on the lids caused the swelling to subside; and, in five days after the operation, I opened the eyes, and the patient saw objects distinctly. He was cured in a short time without experiencing either pain, inflammation, or a staphyloma, consequences which I had reason to apprehend from the

complications of the disorder and the difficulties of the operation; and which, in all probability, would have taken place under any other mode of treatment, and without the precautions which I have pointed out.

From a consideration of this case, we perceive the manifest absurdity of the vulgar notion in regard to the *maturity* of a cataract. The longer a cataract remains, the more difficult will always be the operation, and the more uncertain its success.

SECT.

SECT. XVII.

Upon the Extraction of the Opaque Crystalline, when the Vitreous Humour is diseased.

IT sometimes happens, when the capsule of the crystalline is destroyed, and the crystalline itself perfectly free, that this humour plunges to the inferior part of the vitreous humour, almost to the bottom of the eye, leaving only its upper edge visible through the pupil.

In this case, the hyaloid membrane of the vitreous humour is also most commonly destroyed, and the vitreous humour itself in a state of fluidity. All pressure, therefore, on the ball of the eye must be carefully avoided, since this would produce a large evacuation of the vitreous humour. The only method that can be pursued is to introduce through the pupil a small steel hook, (see fig. X.) to take hold of the crystalline, which, under such circumstances, I have

have often found very small, and with this instrument to disengage it from the bottom of the eye, and so to extract it. As soon as ever the crystalline is taken out, the eye-lids must be instantly closed, in order to retain the vitreous humour; which, without this precaution, would freely and immediately follow the crystalline. I shall now relate two cases, in which the adhesion of the crystalline, and the soft and fluid state of the vitreous humour, rendered the extraction of the cataract extremely difficult, and the directions I have given very necessary to be observed.

CASE XXII.

A poor woman, *de la Ferté sous Jouarre*, who had a cataract in the right eye upwards of ten years, came to consult me in the year 1780. I found all the symptoms of the case favourable to an operation; and the patient gladly submitting to it, I went about it in the following manner. Having first covered the left eye, I divid-

ed

mediately bound up, not only the eye that had undergone the operation, but the sound one also; a precaution which it is necessary to use

time, opened the eye again; when, either from too great an effort, or from a natural convulsive disposition in the eye, which, however, had not discovered itself during the operation, a portion of the vitreous humour, in shape like a small globe, slipped out, which, notwithstanding all my care quickly to close the eye, and to cover it with a compress and bandage, was followed by another portion of the same humour in a more fluid state. The loss of this humour, as nearly as I could judge, was equal to three-fourths of its whole quantity; and though I had often seen considerable portions of it discharged, without destroying the sight, yet in this case, the quantity that escaped was so considerable, that I could not refrain from giving up the eye as entirely lost.

The patient suffered no pain after the operation, and, at the end of three days, I opened the eye; when, to my great surprize, she distinguished every object she looked at, with a clearness, which, considering the accident, was almost incredible. The eye was much reduced in size, and the pupil so much dilated, that if she had not clearly perceived every thing I shewed her, even so as to distinguish the hour on a dial-plate of a small watch, I should have supposed it affected by a complete gutta serena. I have before mentioned, that the dilatation of the pupil is almost always beneficial after the extraction of the cataract. The patient, whose case I have now stated, affords a proof of this observation; having since enjoyed as good a sight as is ever experienced after the most successful operation.

after

after all operations on the eye, even the most simple; it being almost impossible that one eye should not follow the motions of the other. I ordered the patient to be put to bed, and recommended to her to lay her head low, and to move it as little as possible, in order to prevent the escape of the vitreous humour. In a fortnight she was perfectly cured; and though the pupil remained larger than it was before the operation, or than that of the left eye, and had much less motion, yet this eye, as well as the other, perceived objects very distinctly.

CASE XXIII.

M. de Pradine, who is well known in Grenada, arrived in London in the year 1783, in order to have two cataracts extracted, which were of nine years continuance. The pupils were somewhat contracted, and the anterior and posterior portions of the capsule were not only opaque, but as tough as leather, and adherent to the crystallines. The operation was perform-

ed by my father. When the section of the cornea was finished, and my father attempted to puncture the capsule, he was unable to accomplish his purpose, and the crystalline plunged to the bottom of the vitreous humour, which was quite fluid, and the hyaloid membrane of which was totally destroyed. The needle having been found insufficient to puncture the capsule, it was much less able to seize it, and bring it away. A small hook was therefore substituted in the room of it, the extremity of which, being much bent, suceeeded at length in taking hold of it, and raising it, flabby as it was, from the bottom of the eye. The fluid state of the vitreous humour presented difficulties that were almost insurmountable. No one part of the eye could afford any support; the crystalline fled from the instrument as soon as it was touched, and the vitreous humour oozed out insensibly, notwithstanding the most scrupulous care to prevent it. In order to fix the crystalline, it was necessary to make an artificial support for it, with the fore finger of the hand which was at liberty. The operation lasted

lasted upwards of three quarters of an hour; and notwithstanding the loss of a very considerable portion of the vitreous humour, and the fatigue which the different parts of the eye necessarily underwent from the long and repeated manœuvres I have just described, the patient, immediately after the extraction, and before the eye was bound up, perceived distinctly the squares of the window opposite to which he was placed. The crystalline being seized, and, as it were, harpooned, by the small hook, was very large, and almost black; and it brought away with it its two capsules, which were white and adherent to its surface. The appearance of the cataract, as seen through the cornea, was owing to the colour and opacity of the anterior portion of the capsule.

All these unfortunate circumstances did not prevent the patient from being perfectly cured. He neither suffered from pain, inflammation, nor a staphyloma; and it may appear very extraordinary when I add, that his sight was afterwards as good as it usually is after the extraction

of the cataract[2]. The pupil, however, remained much dilated, and slightly irregular.

Both eyes presented nearly the same difficulties in the operation; and yet the same success attended both. And it may here be of use to remark, that when cataracts have been of long duration, they are very often complicated in the way I have described in this and the preceding cases.

It is certainly not easy to conceive how so great a loss of the vitreous humour, as that which happened in the preceding cases, could take place, without being followed with a total deprivation of sight. But it is an undoubted fact, proved by numberless well-authenticated cases, that the sight may be recovered, notwithstanding a very large effusion of it. It is the opinion of some authors, that this humour is regenerated. But is it not more probable, that the aqueous humour supplies the place of the

[2] The operation, in this instance, proved singularly fortunate. But, the Translator is of opinion, that it ought not to encourage a sanguine hope of success in similar cases.

vitreous?

vitreous? And, notwithstanding there is a considerable difference between these humours, in regard to the specific density of each, may not the latter, to a certain degree, perform the office of the former?

When the vitreous humour is undiseased, it never escapes during the operation, unless it be through some error or neglect of the operator. This humour is contained in a membrane, which is evidently double in that part which is situated behind the crystalline. One of its lamina is continued into the substance of the vitreous humour, and forms a number of small cells, which communicate with each other; whilst the other lamen covers the crystalline in such a way, that unless the pressure on the eye be both considerable and improper, the vitreous humour cannot be extravasated. But if this humour be diseased, the case is different, and it is very difficult to avoid the effusion of a part of it; and especially if the operator be not aware of this complication of the case, before he has divided the cornea.

SECT.

SECT. XVIII.

Upon the Extraction of the Opaque Crystalline, when complicated with Varicous Vessels.

IT sometimes happens, that the cataract is accompanied with varicous vessels in the retina, and the choroides[3]; in which case, the operation occasions a considerable hæmorrhage, which, however, soon ceases of itself. The hæmorrhage usually comes on a few minutes after the operation, and whenever it takes place, it is natural to conclude, that the operation will

[3] Though I here mention this complication of the cataract, yet the gutta serena which usually accompanies it, forbids the performance of any operation. Nevertheless, as professional men are often forced to yield to the urgent solicitations of patients who have no glimpse of hope left, but what arises from the mere possibility of succeeding in the operation, it cannot be foreign to the design of this treatise, to state the accidents that are likely to ensue under such unfortunate circumstances.

be

be fruitless and ineffectual. This state of the eye may indeed be previously ascertained, upon an attentive examination. It is much harder than when it is undiseased; the cornea is small and conical; the pupil dilated and immoveable; and, upon enquiry, it will be found that a palsy of the nerve preceded the opacity of the crystalline, and that the patient has suffered considerable pain both at the bottom of the orbit, and in the parts surrounding the eye. The vessels of the sclerotica, also, are varicous, being readily perceived externally, and especially those that are near the angles of the eye-lids.

An hæmorrhage, therefore, is not likely to take place, except in one of those unpleasant operations, which we are sometimes under the necessity of performing, contrary to our own judgment, and merely in compliance with the pressing solicitations of those patients, who, having only this remaining hope, are deaf to every reasonable objection.

CASE

CASE XXIV.

In the year 1760 my father was sent for to Pest, in Hungary, to see the Countess Crachalkowitz, whose husband was president of the council. This lady had a cataract in the right eye. The pupil was entirely motionless, and as much dilated as it usually is in cases of the gutta serena[4]. She had also suffered violent pain before the cataract was formed. The crystalline was of a yellow white colour, and very opaque; the ball of the eye was very hard; the cornea projected towards a point; and many varicous vessels were spread over the sclerotica. This

[4] The pupil is not always dilated in cases of the gutta serena. It is sometimes, on the contrary, considerably contracted, even when both eyes are affected; and when patients are in a state of total blindness, from this cause alone, without any complication with other disorders. This is an observation which the Translator, as well as the Author, has repeatedly made; and it contradicts the opinion of many authors, particularly of Porterfield, who, in his *Treatise on the Eye*, page 183, vol. i. asserts, that the pupil in the gutta serena is always dilated, unless this disorder be complicated with some other.

complication

complication of symptoms discouraged the performance of any operation. However, by the importunities of the lady, joined with those of her relations, and also of the physician who attended her, my father was prevailed upon, and, in some measure, constrained, to perform it; yet still assuring them that it was not likely to be attended with success. The cornea was scarcely divided, and the crystalline extracted, when the varicous vessels in the interior part of the eye began to bleed. The hæmorrhage continued ten hours, at the end of which time it stopped of itself, without producing any bad consequences. The patient was put to bed as soon as possible after the operation. She suffered violent pain for six hours, after which it gradually abated. Nothing remarkable occurred during the consequent treatment. When the eyelids were opened, the pupil was found to have its natural colour, to be quite immoveable, and much dilated; but as, my father had foretold, the lady was still unable to distinguish any object. The wound in the cornea was perfectly closed.

The

The appearance of the eye, after the operation, was less deformed than before, in consequence of the pupil having recovered its natural colour. The ball was not now so hard, nor was the sclerotica covered with so many varicous vessels. The pain also, to which the lady had been very subject, previous to the operation, returned afterwards much less frequently. This was a slight relief, but even this cannot always be obtained. In such cases, therefore, medical men ought never to recommend any operation.

SECT.

SECT. XIX.

Upon the Section of the Cornea upwards.

IN all those cases where the lower or external lateral part of the cornea is opaque,—where the circumference of this tunic is small, and a large section of it necessary,—and where the crystalline resembles an hydatid,—the incision through the cornea should be made from below upwards, in order that the wound may be in its upper and internal lateral part, next the great angle of the eyelids. This incision must be made in a direction contrary to that which I have above recommended in common cases of the cataract; and which, as may havebeen observed, was in its lower and external lateral part, next to the small angle of the eye-lids. In order to make the incision in this manner, the cutting edge of the knife must be turned upwards, and carried on

on in this direction, with the same precautions as if it were intended to make the incision downwards, and with the same care to defend the iris from being wounded. (See fig. 7. and 8.) The incision is made in this way with as much facility as in the former; and by employing it in particular cases, much advantage may often be derived. When a cicatrix, or opacity, exists in the lower or external lateral side of the cornea, no new cicatrix will be added in this part by the operation, and a cicatrix in the upper and inner side of the cornea will neither interfere with the pupil, nor afford any obstacle to the sight. In those cases again where the cornea is small, I have remarked that the crystalline is constantly large, and in them it is necessary to make the incision large, in order that the crystalline may come through it easily. Now if the incision be here made outwards and downwards, the stretch upon the iris will be so great, when the crystalline comes through the pupil, that the iris will unavoidably be engaged in the section of the cornea, and a staphyloma be produced; the reduction of which afterwards

is

is often difficult. But if the incision be made upwards and inwards, the upper lid will entirely cover the wound, and it will be found to heal without any accident. The following cases are added to prove the utility of this practice.

CASE XXV.

M. Sandré had a cataract in the right eye, the extraction of which was attended with many difficulties. The crystalline was very large, and the cornea very small. The cornea had a natural opacity round its circumference, which left but little room to make the section, and this opacity was much more considerable in its inferior and outer part than in its superior. The patient, however, consented to the operation, as the only means by which he could possibly recover his sight; and it was accordingly performed in the year 1782, in presence of M. de la Planche, a physician in Paris, who was both a colleague of mine, and a relation of M. Sandré. The incisions of the cornea and of the capsule were both made at the same time, and

upwards, in the manner I have above directed. The vitreous humour repeatedly presented itself before the opening, but was retained by this situation of the section. The crystalline, though very large, came out easily, and the operation was as successful as could be wished. No staphyloma followed, and the incision in the cornea readily healed. If the incision in this case had been made, as it usually is, in the inferior and outer part of the cornea, it would have been likely to produce this accident, and if it had been made horizontally, this could not have been avoided.

CASE XXVI.

In the year 1765, my father was sent for to London to attend his Grace the Duke of Bedford, who had a cataract in each eye. He performed the operation in the presence of M. Gataker, a gentleman whom I have already had occasion to mention. The same difficulties presented themselves in this, as in the preceding case. The

The cornea in both eyes was very small, and in their inferior part there were opacities occasioned by previous inflammations. The crystallines appeared to be larger than usual, which rendered it necessary to obtain apertures in the cornea proportionably large. These were made, in the manner I have just directed, in the superior and internal lateral part of the cornea, in order to avoid both an increase of opacity in this tunic, and also a staphyloma. The incisions were completed in both corneas without attempting, till afterwards, to puncture the capsules. The extreme sensibility of the patient rendered this caution necessary, who, at the instant the knife was performing its office on the left eye, suddenly drew back his head, and almost threw down my father's assistant. By this accident the Duke was exposed to the greatest hazard of receiving an injury, and his escape from it was solely owing to my father's care, who followed him in his motions, and happily terminated the incision upwards with perfect safety. During the progress of the instrument, in making the incision of the right cornea, there was

reason

reason to be apprehensive that a similar accident would have happened; and, in fact, it did take place, but with less violence than in the first instance. Both capsules were next punctured with the needle; after which, the crystallines were extracted, without the loss of any part of the vitreous humour; a circumstance which might easily have occurred, in consequence both of the fluidity of this humour, and the unsteadiness of the patient. It was indeed prevented, partly by the sudden closure of the eyelids, but especially by the position of the incision through the cornea. Notwithstanding this was large, no staphyloma ensued; and, in the space of a fortnight, his Grace was cured, without one untoward accident; upon which he again appeared at court.

The crystalline humour is sometimes reduced almost wholly to the state of a purulent fluid, in the centre of which a very small nucleus only remains solid. In such cases the capsule becomes disengaged from its adhesion to the neighbouring parts, and, with the crystalline contained in it, very nearly resembles an hydatid

datid tumour. This species of the cataract is not difficult to be discovered. The pupil is entirely filled by it, being very often immoveable, and the crystalline appears to be very white. A small projection of the iris may also be observed, which is pushed forward by the hydatid behind it; and in consequence of this, the space of the anterior chamber is diminished. When an operation is performed on account of such a cataract, even the slightest pressure on the eye must carefully be avoided; it being necessary to restrain rather than to encourage the extraction of the crystalline; and the upper lid must be dropped the instant the incision of the cornea is finished. This incision should be performed, as in the two preceding cases, inwards and upwards; since, if it be made, on the contrary, in the usual method, downwards and outwards, the crystalline will escape with too much rapidity, and the membrane of the vitreous humour being at the same time almost wholly destroyed, a large portion of this humour will escape with it. Whenever such an accident

happens, though the sight may not be entirely lost, it will at least be much injured.

CASE XXVII.

The celebrated Euler, who died in the year 1784, was attacked with a cataract at Berlin. The crystalline humour suppurated, its centre alone remaining solid; and this floated in the opaque fluid contained in its capsule; so that the whole taken together resembled a small bladder[5]. According to the account I received from

[5] The structure of many parts of the human body may be so considerably altered by disease, that we shall often err, if we attempt to judge what they ought to be, from their appearance when thus affected. The crystalline humour, inclosed in its capsule, under the form of an hydatid, in which state I have often seen it, is a proof of this assertion. It exhibits the appearance of a small smooth ball, and seems to have no attachment or continuity with any other part. From hence we might be led to conclude, that the capsules of the crystalline are particular membranes, distinct from the hyaloid tunic, and not prolongations of it. This has been the opinion of some anatomical writers, and particularly of Cusson. (See his Remarks on the Cataract, p. 12, 15.) But when we consider, further, that such a state of the crystalline is merely the effect of disease; and that

from the surgeons who had examined the eye, the pupil was immoveable. Under these circumstances, the cataract was extracted by an oculist, who suffered the greatest part of the vitreous humour to escape with it; insomuch that M. Euler did not afterwards recover his

that when it occurs, the hyaloid membrane of the vitreous humour is at the same time always destroyed, we shall see cause to doubt the validity of this conclusion, and to admit the evidence of a contrary doctrine, which results from the dissection of a sound eye. It is indeed difficult to conceive how the hyaloid membrane, which, in its natural state, not only envelopes the crystalline humour, but retains it in its place, should become so completely detached from the vitreous humour, round the circumference of the lens, as afterwards to remain solely adherent to the crystalline, and to assume the appearance of a distinct well formed tunic. Nevertheless such a change not unfrequently takes place; and it is no less certain that this change is occasioned by some malady. It appears to me to be produced by the projection of the anterior part of the crystalline; by the action of which on the hyaloid membrane, this membrane is gradually drawn forwards, and detached from its adherence to the vitreous humour; and this humour, being thus deprived of the anterior part of its tunic, is left free and floating in the eye; in consequence of which, when the operation is performed for the hydatid cataract, the vitreous humour almost always and unavoidably escapes. Such an accident, however, is best prevented by making the section of the cornea upwards and inwards, in the manner I have recommended above.

sight. He had, at that time, an incipient cataract in the other eye; and soon afterwards totally lost the sight of it, on a journey from Berlin to Petersburgh, in which place he proposed to reside. My father, who was sent for to Petersburgh, in the year 1771, by M. le Comte Rasoumoufsky, Hettman des Casaques [6], was consulted by M. Euler. Having examined the eye, he recommended the operation, which advice this learned man eagerly adopted. The section was made in the upper part of the cornea. The crystalline, which was soft, and in the form of an hydatid, like that of the other eye, came through slowly, as my father wished it, and he found no occasion to puncture the capsule. The vitreous humour had no opportunity given it to escape, and no accident of any kind either attended the operation, or resulted from it. The pupil became a little more

[6] M. le Comte Rasoumoufsky had in each eye a sort of unguis, which has never yet been accurately described by any author. These excrescences were accompanied with very large varicous vessels, and required a long and difficult operation. I shall give a particular detail of this disorder in another place.

moveable than it was before [7], and the patient recovered his sight. The success of this operation is recorded in the Commentarii Medicinæ de Leypsick [8].

CASE XXVIII.

In the year 1781, I was consulted by Mademoiselle de la Verdine, who then lived in Paris. She had submitted to have one cataract extracted by an oculist in that city, but without the smallest success; and the failure I imputed to

[7] Although it is most commonly observable, that the pupil has less power to contract and dilate after the operation than it had before, yet it sometimes happens that this power is sensibly increased. Such cases, indeed, are very unusual, and they seem to be owing to the following circumstance: The iris having been compressed, either by the enlargement of the crystalline, or by its adhesion to some part of this membrane, becomes free when this humour is extracted, and either recovers its natural state, or at least approaches nearer to it than it was before.

[8] Vol. xvii. part 3, artic. *Nova Physico Medica*, p. 540. Petropoli die 28 Septem. Clar. Leonardo Eulero, "visus "amissus felici operatione cataractæ à celeb. lib. Bar. à "Wenzel, restitutus est."

the

the escape of almost the whole of the vitreous humour, together with the crystalline. This judgment I formed from the inspection of the eye, which was now much smaller than the other, and from the appearance of the pupil, which was clear, black, and moveable. On examining the other eye, the convexity of the iris, together with the shape and colour of the cataract, led me to suspect that the crystalline was dissolved, and in the form of an hydatid. It had the true vesicular appearance I have above described. This determined me to make the incision upward, and immediately the crystalline inclosed in its capsule came through the aperture, as completely and as favourably as I could have wished. The vitreous humour, which presented itself before the incision, was retained by speedily dropping the upper lid. I directed the patient to place her head in a low position, and to lie as still as possible, without using any motion that was not unavoidable. She remained three days, perfectly tranquil, in the same position. I then removed the dressings, and found the cicatrix well formed. No

accident happened, and, at the end of a fortnight the lady made use of her eye. The pupil became more free, and the iris had its natural appearance; except only that it acquired a vibrating or trembling motion in the aqueous humour [9], which still remained perfectly limpid.

[9] The circumstance of a trembling motion in the iris, to which oculists do not seem to have paid sufficient attention, takes place, not uncommonly, after both the extraction and depression of the cataract. It is difficult to describe, although very easy to perceive it. It is a sort of undulation which seems to be occasioned by the aqueous humour, though this humour undergoes no real change. The cause of it, which is distinct from that of the contraction and dilatation of the pupil, may in a great measure be attributed to the absence of the crystalline; in consequence of which, the iris loses a great part of its support.

SECT. XX.

On the Opacity of the Fore Part of the Capsule, the small Portions of the Crystalline that sometimes remain after this Humour is extracted, and the Effusion of the Vitreous Humour during the Operation.

CASE XXIX.

THE wife of a shoemaker, named Françoise, consulted me in June, 1785, having lost the use of her left eye for many years. This was occasioned by a very white cataract, the extent as well as the colour of which inclined me to believe the crystalline was soft; and the truth of my opinion was confirmed by the event. The motion of this pupil was not so free as that of the right eye, which was undiseased; and both eyes were small, and situated deep in the orbits. The woman had a great dread of the operation:

operation: she however committed herself to my care, and consented to have it performed. I first made a simple section of the cornea, without attempting to wound the capsule with the cornea knife. This I afterwards opened by means of the needle. I then proceeded to extract the crystalline, which, as I expected, was very soft; but, contrary to what is usual in such cases, it adhered to the iris, and came through the cornea with difficulty, even after its adhesions were destroyed. During its extraction a part of the vitreous humour projected through the pupil, and a small portion of it escaped; but by quickly shutting the lids, its further effusion was prevented. I was obliged, however, to open the lids again, after a few moments had elapsed, to satisfy myself that no part of the crystalline remained behind; which precaution was not without its use; since I now found that an opaque substance still remained; which, filling the aperture of the pupil, formed as complete an obstruction as that which had been occasioned by the entire crystalline, before it was extracted. This substanc

stance I removed; but in so doing I was unable to prevent the escape of another portion of the vitreous humour. The pupil afterwards appearing clear and black, I applied a compress on the eye, and retained it with the usual bandage. I directed the patient to be kept very still, prescribed a proper regimen, and being encouraged by the success I had met with in many similar operations, under which a much greater quantity of the vitreous humour had been discharged, I gave her hopes of recovering the sight of this eye. The compress and bandage were not removed till after the expiration of four days, nor was the eye touched during this time, lest another portion of the vitreous humour should escape. She suffered no pain after the operation, which indeed is most commonly prevented by the discharge of the vitreous humour. But when I uncovered the eye, and opened the lids, she could scarcely perceive any object before her. I examined the pupil with great attention, and still discovered in it an opaque body, which almost entirely occupied the space of this aperture. It proved to be a portion of the crystalline,

talline, similar to that I had extracted after the removal of the lens. This, I suppose, while the eye was bound up, detached itself from the border of the capsule, to which it previously adhered, and by which adhesion it was kept out of my sight during the operation. The wound in the cornea was now united, and the eye being very irritable, I thought it best to leave the case for the present, and to wait till the eye should be in a proper state to undergo a second operation. After some months the woman came to me again, the wound in the cornea being now perfectly re-united. But the pupil was still obstructed by the same opaque body I had before seen, and the rays of light entered the eye through only a very small aperture. By means of this she saw a little, but not sufficiently to enable her to go about, and to take care of herself. Being determined to try every thing that afforded a hope of having the sight of this eye restored, she readily agreed to my proposal of repeating the operation. I was convinced that if I made the incision in the inferior part of the cornea, a portion of the vitreous humour would unavoidably

bly escape, during the extraction of the opaque substance in the pupil; and therefore I determined to make this incision in its superior part. In effecting this I was in some degree embarrassed by the iris, which, on the escape of the aqueous humour, came forward, and enveloped the blade of my knife. However, I terminated the section happily, after having disengaged this membrane by gentle frictions on the fore part of the cornea, in the way already recommended. I then attempted to remove the opaque portion of the crystalline that remained in the eye, and obstructed the admission of the light, but on introducing the curette, I found a resistance to the instrument, and discovered that this resistance was produced by the anterior part of the capsule, which being in part opaque, and, at the same time, adherent to the pupil, kept back the remaining portion of the crystalline. Though this capsule had been divided by the needle in the former operation, the wound was now re-united, and the whole of it was become as hard as the shell of an egg. I removed it almost in one piece, by means of a small forceps,

ceps, contrived for such purposes, and afterwards I extracted the opaque portions of the crystalline that remained in the eye. As the vitreous humour was prevented from escaping during this part of the operation, by the situation of the section in the cornea, I employed, according to my usual custom in operations for the cataract, a gentle friction on the fore part of the cornea, both with the back of the curette, and also with the end of my thumb; and being at length satisfied that all the opaque matter was removed, because, if any part of it had remained behind, the friction would have brought it forward to view, I bound up the eye.

Though the operation was long and fatiguing, yet the patient suffered very little pain from it; and the incision of the cornea closed up in a few days, without either an inflammation or staphyloma. I used no particular remedies that deserve to be mentioned. The pupil remained clear and black, though much larger than it naturally is, and slightly deformed. This was undoubtedly occasioned by the efforts that were necessarily

necessarily made to separate the adhesion between the capsule and the iris. In the event, the sight became as good as it could have been after the most successful operation.

SECT.

SECT. XXI.

On the Cataract that has its Seat in the Humor Morgagni.

THOUGH the separate existence of the humor morgagni is not admitted by a celebrated author[1], who asserts, that when a humour is found within the capsule, it is produced solely by a dissolution of the crystalline, yet these humours appear to be totally distinct from each other; since the former is observed to undergo various changes, while there is no sensible alteration in the structure of the latter. The following cases, and many others that have fallen under my observation, fully convince me of the truth of this opinion.

[1] Percival Pott, Remarques sur la Cataracte, p. 499, in 8vo. traduit de l'Anglois.

CASE

CASE XXX.

In the year 1765, a young man put himself under the care of my father, in London, who had a cataract in the right eye, the colour of which was extremely white. It was remarkable in this case, that as soon as the cornea and the anterior portion of the capsule were opened, and before the section was completely finished, a milky substance issued out of the pupil, and escaped, with the aqueous humour, through the aperture in the cornea, leaving the pupil as clear as that of an eye from which the opaque crystalline had been completely extracted. It was at first supposed, that this opaque substance was the crystalline itself, in a state of suppuration. The patient recovered his sight, and distinctly perceived many small objects that were placed before him. A convex glass, suitable for a person who had had the crystalline removed, was placed before the eye of the patient, in order

order to try the effect it would produce; but all objects seen through it at the usual distance, were as indistinct and confused as they commonly appear to a person whose eyes are sound, and who looks at them through a similar medium. This circumstance surprized my father very much. However, the eye was bound up, and the patient was put to bed. The next day, on removing the dressings, a foreign body was observed between the edges of the eye-lids, which was immediately known to be the crystalline, in its natural state of transparency. The substance, therefore, which was removed on the preceding day, must have been the opaque humor morgagni, since the crystalline was found to be in its natural state, not only in point of transparency, but likewise of size. The young man, when the cure was completed, saw like other persons who have had the cataract extracted, and required the use of a similar convex glass.

CASE XXXI.

I made a journey with my father to Vienna, in the year 1774, and there I had an opportunity of observing several cases similar to the preceding, in some operations performed by myself, and still more in the great number of those which were performed by him. One remarkable instance occurred in the case of a young child, who had a cataract in the left eye. The crystalline had a bright white colour, and entirely filled the pupil. The cornea and the anterior portion of the capsule were scarcely divided, when a milky matter escaped with the aqueous humour, and the child perfectly distinguished objects in an instant. This inclined us to believe that the crystalline had been completely dissolved. But the next day, on removing the dressings, I found the crystalline lodged in the incision of the cornea, the lips of which were kept separate by it. It came away with the

the dressings, transparent, colourless[2], and rather small; being probably reduced in size in consequence of the softest part adhering to the linen. Nothing remarkable occurred in the sequel of this case, and the child obtained a perfect cure.

Since that time it has fallen in my way to perform the operation upon two poor men, one of Compiegne, and the other of Dammartin, each of whom presented the same phænomena. But by a slight pressure on the eye, after the opaque

[2] The crystalline humour in children is very transparent; but as persons advance in life it assumes a slight yellow colour. There are authors who pretend to have discovered vessels proceeding from the central artery of the retina to be inserted into the body of the crystalline. But, inclosed as this body is in a capsule, with which it is furnished from the hyaloid membrane, and immersed in the fluid contained in this capsule, it does not appear to me to have any communication with other parts of the eye. It is difficult to comprehend how the crystalline can preserve its transparency, when the fluid in which it floats is diseased. I shall not attempt to solve this difficulty; but shall content myself with observing, that there is a multitude of similar facts in the practice of physic, of which it is perhaps impossible to assign the cause, but which, notwithstanding, do undoubtedly exist.

SECT. XXII.

On the Separation of a Part of the Iris from the Choroides; a Circumstance which sometimes takes Place in the Operation of the Cataract.

AMONG the inconveniences to which the iris is liable, during the process of this operation, I shall take notice of its separation from the choroides in any part of its circumference. Although this accident very rarely occurs, yet, as it may happen, it becomes a matter of considerable moment for surgeons to be aware of it.

CASE XXXII.

In the year 1776, my father was sent for to Haerlem, to perform the operation of extraction upon Madame Patin, wife to a burgomaster of that

that city, who had a cataract in each eye. Neither of them presented symptoms that could excite an apprehension of danger or difficulty in the operation. Nevertheless the cornea and the capsule were scarcely opened, when the iris detached itself, in its inferior and outward lateral portion, to the extent of about a fourth part of its circumference. This accident, without doubt, was occasioned by the impulse of the humours of the eye forward; the lady's eyes being naturally prominent, and likewise very irritable. The crystalline afterwards found an easier passage through this incidental opening, than through the pupil; and a considerable portion of the vitreous humour escaped with it, notwithstanding great care was taken to drop the upper lid as speedily as possible.

It was very extraordinary that the other eye should likewise exhibit precisely the same phenomenon. For, during the operation upon this eye, the iris was detached, in the lower part of its circumference, from its connexion with the choroides; and here, also, the crystalline came

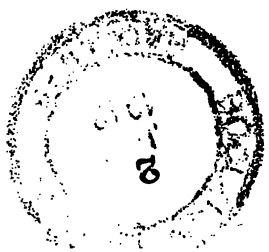
came through the new opening. Happily, however, this accident did not, in the smallest degree, prevent the success of the operation in either eye. The patient experienced neither pain nor inflammation. Indeed, as we have already observed, when a part of the vitreous humour is lost, it rarely happens that much inconvenience arises from either of these causes. And its further effusion was prevented by placing her in bed, on her back, with her head low. The dressings were not removed for several days; and when the lids were opened the lady distinguished every object perfectly. Upon examining the eyes, we were, however, very much surprised to find that both the pupils were closed, and that the light was admitted only through the aperture made by the separation at the bottom of the iris. This new pupil was exactly similar in shape to that of a cat; but it was nearly horizontal, and opposite to the inferior part of the cornea. The entire closure of the natural pupil appeared to us a very extraordinary circumstance, because the lady had felt no pain;

pain; whereas, it is well known that such an accident rarely happens, but in consequence of severe suffering. This artificial pupil, however, proved to be as serviceable to the lady, as the real and natural pupil could have been; for after three months had elapsed, she was able, with the aid of proper glasses, to read the smallest characters.

In case, therefore, of a like accident, we are not to despair of a cure; nor are we to persist in attempting to force the crystalline through the pupil, if it shew a greater tendency to pass through the new opening; and, especially as the pressure that would be requisite for this purpose might cause a large proportion of the vitreous humour to issue through this channel.

CASE XXXIII.

In a journey which I took with my father to Groningen, in the year 1776, I saw a case nearly similar to the preceding, which proved still



still more fortunate in the event; I mean with regard to the artificial pupil.

A poor man consulted my father on account of a cataract in each eye, which had deprived him of sight upwards of two years. We examined his eyes attentively, and from the appearance of them, had reason to conclude, that the extraction of the cataracts might be easily and successfully accomplished. His eyes were very prominent, and irritable; the pupils dilated and contracted with great freedom; and when the hand was moved before them, the patient perfectly distinguished it. In short, the case was eminently attended with the most promising and desirable symptoms. The cornea in each eye was divided, without attempting to open the capsules, on account of the great agitation of the patient. These were afterwards punctured with the gold needle. The crystalline of the left eye passed without difficulty, although the disease in this eye had been of longer duration than that of the other. On my father's applying the customary pressure on the right eye, the iris became detached in its lowest part from its connection with

with the choroides; and the crystalline, instead of advancing through the pupil, escaped from its capsule, and moved towards this new opening in the iris. My father facilitated its extraction by means of the curette; and the accidental opening in the iris was rendered much wider by the passage of the crystalline lens, which was very large, through it. A small portion only of the vitreous humour escaped. The crystalline was firm, and came out entire, leaving no fragments behind it; and, indeed, if any such fragments had remained in the eye, they would soon have escaped with the vitreous humour. The usual compress and bandage were applied; and, in order to avoid a fresh discharge of the vitreous humour, the precautions that are common in such cases were recommended; such as keeping the head low, lying on the back, and preserving the most perfect tranquillity. The dressings were not removed for several days, that a competent time might be allowed for the perfect re-union of the wound in the cornea. The pain which the patient endured was by no means exquisite; that of the

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left eye affected him most; and, at the end of ten days, a much longer time than is requisite in simple cases, I opened the lids, when he perfectly distinguished every object. The pupil of the left eye was round, and the cicatrix perfectly consolidated; that of the right eye was a little oblong, which shape it had acquired in consequence of a part of the iris being included in the cicatrix; but as the cicatrix was very near the sclerotica, it did not at all intercept the sight; and after some months, and with the assistance of proper glasses, the patient could read the smallest characters.

In consequence of the iris being included in the cicatrix, and united with it, the aperture made by the separation of its inferior fibres became invisible. This proved advantageous to the patient, since it not only prevented a slight deformity, but, if the natural and artificial pupils had both continued, the sight would probably have been confused by them. It is also probable, that if this separation of the inferior fibres of the iris had not happened, a staphyloma would have been formed; since, notwithstanding

standing the distance which necessarily took place between the iris and the wound in the cornea, in consequence of this accident, the iris became entangled in the wound, whilst the eyelids were kept shut.

The two preceding cases, which are such as rarely occur, if I may be allowed to judge from the few examples of this kind which I have found amongst the numerous authors that have come within my knowledge, seem to favour the opinion of those anatomists who consider the iris as a membrane distinct from the choroides, and not a continuation of it. Riolan is perhaps one of the first who was of this opinion[4]; and it was afterwards adopted by many others. Duverney[5] supposed the iris to be distinct from the choroides, and so did Zinn[6]. On the contrary, Winslow[7], Senac[8], Le Cat[9], Porter-

[4] Antropolog. lib. 14. cap. 4.

[5] Lieutaud par M. Portal, 1777, vol. ii. p. 51.

[6] Descript. Anatom. Ocul. in 4to. Gottingen, 1755, p. 101. Hoin, Mercure de France, Aout, 1769, p. 154.

[7] Expos. Anatom. in 4to. Paris, 1732, p. 662.

[8] Anatom. d'Heister, in 8vo. Paris, 1735, p. 692.

[9] Traité des Sens, Paris, 1742, in 8vo. tom. i. p. 374.

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field[1], and Haller[2], have supposed that the former was a continuation of the latter. Guerin[3] foresaw the possibility of a separation of the fibres of the iris, when the crystalline was obstructed in passing through the pupil; but he has produced no one instance of this accident. Janin[4], likewise, has barely taken notice of it. This separation sometimes takes place upwards, and sometimes on the side next the inner angle of the lids; but in whatever part it occurs, the crystalline always comes through the artificial opening.

[1] Treatise on the Eye, vol. i. in 8vo. Edinburgh, 1759, p. 152.

[2] Physiol. tom. v. in 4to. Lausane, 1769, p. 369.

[3] Malad. des Yeux, in 12mo. Lyon, 1769, p. 219.

[4] Malad. des Yeux, p. 417, in 8vo.

SECT. XXIII.

On the Re-union of the Fibres of the Iris, after their Division by the Knife, during the Section of the Cornea.

IT has repeatedly been proved, that the fibres of the iris, after being divided, are capable of re-uniting; and the complete union which sometimes takes place between the sides of the pupil, after blows on the eye, as likewise after the hypopion, or severe inflammations, and occasionally, even after the operation for the cataract, seems to corroborate the truth of this assertion. The possibility of such a re-union between the sides of a wound in the iris, has induced me to recommend the removal of a portion of this membrane, in the operation of making an artificial pupil[s]. By this precaution,

[s] See the 27th Section.

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the re-union of the sides of the new aperture (an accident which often occurred when the operation was performed in the manner recommended by Cheselden) will be avoided. The following case fully proves that a wound in the iris, if made according to the direction of its straight fibres, may again be united.

CASE XXXIV.

Mrs. S. had lost the sight of her left eye for two years, without any preceding pain or inflammation. This lady consulted me in the year 1785, and on examining the eye, I immediately perceived, from the colour of the pupil, that she had a cataract, which was soft and milky; the whole extent of the pupil, as is usual in such cases, being fully occupied by it. I proposed an operation, to which she immediately consented. The extreme agitation of her spirits, at the time of the operation, determined me, first of all, to make a simple division of the cornea, and not to attempt, till afterwards, to puncture

ture the capsule. The event justified my precaution. For, when the point of the instrument, which I directed towards the inferior and internal lateral part of the cornea, had passed the pupil, the lady, whose agitation increased, suddenly turned her eye towards the knife. This violent motion it was out of my power to prevent; and, notwithstanding all my care and dispatch, the inferior part of the iris was wounded by the point of the instrument. After having disengaged it, I had still the utmost difficulty to complete the section of the cornea; since all the arguments and intreaties I could use to compose the patient were ineffectual; and she suddenly threw her head backward with so much force, that she nearly threw down the person who supported the upper eye-lid. I found it no less difficult to puncture the anterior portion of the capsule with the gold needle; nor was it, till I had made repeated efforts to this purpose, that it was accomplished. At length, after having perfectly extracted the cataract, as well as the opaque particles, which, as is sometimes the case remained behind, I examined

the state of the eye. The pupil was contracted, but retained its natural shape, and its appearance was black and very clear. That part of the iris which the instrument had wounded, was situated about the distance of one line (1-12th part of an inch) from the inferior border of the pupil. It was of an oval shape, nearly a line and a half in length, and half a line in breadth; and the separation in the fibres of the iris was nearly in a perpendicular direction. The sight was not injured by this accident, since, immediately after the operation, the lady perfectly distinguished every object presented to her. Having often observed, under similar circumstances, that wounds in the iris would again unite, I did not despair of effecting a complete cure in the present instance. I pursued the usual treatment, and it proved successful. The pain she suffered was moderate, the inflammation was very inconsiderable, and no staphyloma ensued. After some days, I opened the eye, and found the pupil clear. The wound in the iris, likewise, was greatly diminished. When a few days more had elapsed, it was scarcely perceptible; and,

and, in the space of a fortnight, it was impossible to distinguish that the iris had ever been injured. She was soon able to read with the help of proper glasses, and at this time retains a good sight, though upwards of fourscore years of age. The operation was more tedious than it usually is, not only on account of the patient's restlessness, but also by reason of the small aperture between the eye-lids, the depth of the eye in its socket, and some adhesions which the cataract had formed, and which it was necessary to separate.

SECT. XXIV.

On the Treatment of Patients after the Operation.

WHATEVER mode of performing the operation may be adopted, and whatever precautions may be used, we must not flatter ourselves that pain and inflammation can always be prevented. I can, however, truly assert, that inflammation and excessive pain occur much less frequently when the operation is conducted in the manner I have recommended, than when it is performed in any other way. In fact, an operation which is usually finished in half a minute, and which seldom requires the use of more than one instrument, or two at most, is likely to be attended with fewer inconveniences than one which takes up much more time, and a greater variety of means. It must prove detri-

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mental to multiply instruments unnecessarily; and those who do so forget a precept which has been laid down by the greatest masters in the art of surgery, *to make all operations as simple as possible.*

When the operation is completed, it is necessary to guard against wetting the eye, by the application of any liquid whatsoever, not even with a mixture of brandy and water[6], which it

[6] I have occasionally used, not only brandy and water, as above mentioned, but many other applications; and after much attention to the effects which they produce, I believe them all to be more injurious than useful.

The experience of the Translator has however produced in his mind a very different opinion from that of the Author, as expressed in the preceding note. He has found, that a dossil of lint steeped in plain water, or brandy and water, and covered with a spermaceti, or saturnine cerate, and removed once every day, is the most easy and convenient dressing that can be applied after the operation. The cerate over the lint prevents the latter, when impregnated with the discharge, from becoming stiff, and irritating the lids.

The Translator takes this opportunity to remark, that the mode of applying the compress and bandage over the eye, after the operation, is a circumstance of no small importance, and deserves a greater degree of attention than either the Baron, or his father seem disposed to bestow upon them. If the bandage, for instance, sit too loose round

it has been customary to use on this occasion. The eye should simply be covered with a dossil of lint; over which a dry compress should be applied, which is to be tied on with a bandage. The dressing should, in general, be removed every day, to dry up the tears, and to wipe away the matter which usually collects in the great angle of the eye, and about the lids. Par-

round the head, the dressings are very apt to slip off, and in consequenee of it to press unequally and injuriously on the eye; and if too tight, the undue pressure will excite pain and inflammation, and may perhaps express a part of the vitreous humour. The compress the Translator employs is made of soft linen, folded two or three times, wide enough to cover both eyes, and sufficiently long to extend from the upper part of the forehead to the lower part of the nose. This he pins, at the top, to the patient's night-cap; and its lower part, which is divided in the middle, to allow the nose to come through it, he lays loosely over the eyes. The bandage, which is also made of old linen, and equal in breadth to that of six fingers, he carries round the head over the compress, and pins to the side of the night-cap moderately tight. This he pins on the side of the night-cap rather than on its back part, in order that the dressings may be removed when necessary, without lifting the patient's head from off the pillow. He afterwards carries a slip of linen under the chin, and pins it, at each end, to the side of the bandage, to prevent it from slipping upwards.

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ticular circumstances, however, may sometimes render it necessary to leave the same dressings on for several days, as I have already observed in a preceding section.

If both eyes have been operated upon, it is proper that the patient should lie on his back; if one eye only, he should lie on the opposite side. By observing this method, a deformity in the figure of the pupil will often be avoided, the discharge of the aqueous humour will not be continued so long a time as it otherwise would be, and that of the vitreous humour will be prevented. The pain, inflammation and swelling of the eye-lids will also be obviated; accidents which are not unfrequently produced by a tight pressure on the ball of the eye.

On the first and second day, the patient should take only weak broths, together with diluting and cooling drinks, such as barley water, veal tea, chicken broth, whey, and the white emulsion, or else acidulated liquors, such as lemonade, or orange juice and water. After the third day, if there have been no pain

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in the eye, the use of light meats, and a stronger broth with herbs in it, may be allowed. But if an inflammation or pain in the eye should come on during any part of the confinement, the patient should be immediately bled in the foot; and this operation should be repeated once or oftener, as circumstances may require. In this case also, he should be put upon a severer regimen, and the use of antiphlogistic remedies should be longer continued.

I must not omit to mention, that the lower eye-lid should be drawn a little downwards, each time of changing the dressings; since the edge of it is not unfrequently turned inwards, and, insinuating itself between the lips of the wound, keeps it open, and has sometimes occasioned very considerable mischief. This accident, however, is less considerable, and less frequent, when the incision of the cornea is made obliquely, according to our mode of performing it, than when it is made horizontally. Yet the precaution I have mentioned is always proper, and, if attended to, may often prevent a staphyloma.

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The watering of the eyes, which takes place very commonly when the dressings are left off, and the eyes are exposed to the light, ought not to give any alarm. This sometimes lasts ten or twelve days, and then gradually decreases. I know of no remedy that has any efficacy either in restraining or lessening this inconvenience. It gradually ceases of itself, in proportion as the eyes gain strength, and become accustomed to the action of the light, and of the air.

The œdematous swelling of the lids, which also often takes place after the operation, and continues nearly as long as the watering of the eyes, is of little consequence, and should occasion no disquiet or uneasiness. It naturally subsides of itself, without any application, whenever the eye is exposed to the air. Tonic and various other applications that have been recurred to in like cases, are at least useless, and sometimes have retarded the cure. It is better to trust to nature alone for the removal of this inconvenience. And the surest way to dissipate

dissipate the swelling, and to shorten the duration of it, is, as soon as it is perceived, to leave the eye uncovered. This swelling prevents the lids from opening freely, and consequently the rays of light cannot readily be admitted into the eye; which, however, at any rate, could not materially affect the sight.

The swelling of the lids is sometimes so considerable, that it cannot but excite some apprehensions with regard to the success of the operation. Yet we may rest assured of a favourable issue, if the patient suffer no pain, and if he perceive the light through his eye-lids. From considerations of this nature, I was satisfied in my own mind that the operation described in the following case would prove successful.

Le Sieur Merry, a Swiss porter at one of the gates of the Tuilleries, underwent the operation of having a cataract extracted, which, at the time it was performed, was attended with the usual success. But three weeks afterwards,

terwards, he was unable to separate the eye-lids; and they were then so much swelled, and so great a quantity of tears and matter was collected in the eye, that when it was opened for the space of a second or two, the patient was not able to distinguish any object whatever. Notwithstanding this discouraging circumstance, he perceived the light through the eye-lids; and as no unfavourable accident had happened during the treatment, except that he had a troublesome cough, I did not abandon the hope, that his case would terminate happily. In fact, the swelling of the lids gradually decreased, without the use of any remedies; and when the patient was able to open his eye without assistance, he saw all objects pretty distinctly. In proportion as the flowing of the tears and the swelling of the lids abated, his sight very sensibly improved.

There are instances in which a slight depravity of sight takes place after the operation; as when objects appear double, which is sometimes the case; or, as at other times, they

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are seen under a shape somewhat different from that which they really exhibit. Bodies, for example, that are round, appear to patients of this description, of a long or eliptical form. But this incorrect vision goes off by degrees, and commonly in a month or six weeks after the operation, no imperfection remains.

But the most formidable accident that follows the operation of extracting the cataract, is a violent inflammation of the globe of the eye; during the continuance of which, the conjunctiva becomes considerably inflated, and the eye immersed in a large quantity of acrid matter. In consequence of this, the cornea not unfrequently becomes opaque, and purulent matter is collected behind it; the matter being sometimes found in both chambers of the aqueous humour; and from this cause, the patient suffers excessive and incessant pain. If the remedies that are usually directed in cases of inflammation, both those which are more general, as well as those which are particularly adapted to such cases,

be insufficient to produce an absorption of the matter, which indeed too often happens, the case is hopeless; and the pain will not cease until the suppuration is complete, and the eye sunk and lost. I am not aware of any assignable cause for this melancholy accident, unless it be owing to a vitiated state of the humours in the patient's general habit, or to some local defect in the original structure of the eye. But, be this as it may, I am happy to subjoin, that it very seldom occurs in the course of our practice.

Again, a collection of purulent matter is sometimes formed in the eye within a few days after the operation, without any external symptoms of inflammation, and without being preceded by any remarkable sensations of pain. This abscess of the eye presents two diseases, which the antients distinguished by two different names; viz. Hypopion, when the collection of matter was lodged in the anterior chamber; and Empyesis, when in the posterior. Whenever it is suspected that such

such a deposit is made, the existence of it may be ascertained by gently opening the eyelids after the second or third day. The cornea, in this case, will appear dim, the iris of a greenish hue, and the aqueous humour thick and turbid. A large blister should immediately be applied, either to the nape of the neck, or behind each ear; and recourse should be had to bleeding, evacuating, and such other general remedies as are calculated to promote the absorption of the matter. The affected eyes should be left free, without either compress or bandage; topical applications being never of any use, and often tending to increase the violence of this disorder.

The bare mention of a curious resource, which was adopted by an oculist called Justus, a cotemporary of Galen, who wisely shook the head of the patient till the abscess burst, and the matter found an easy vent, is enough to excite ridicule [7].

[7] Scultet. Append. varior. Instr. p. 57.

Nor

Nor does it require profound discernment to see the absurdity of the instrument contrived by Platner, in the form of a tube, in order to draw out by suction the pus contained in the chambers of the eye [8].

Nor shall I dwell upon the extraordinary method which Woolhouse mentions as having been used with success, but which is, in fact, almost as ridiculous as that of Justus. See a dissertation by David Mauchart, preserved by Dr. Reuss, and published at Tubingen [9].

The operation recommended by Galen [1], which consists in again opening the cornea, ought not, I think, to be used in the present case; for the matter would not escape through this second opening without great difficulty. And even in cases where the first wound remains open, it would be found almost impracticable to give vent to the matter; and if accomplished, a new quantity would quickly be

[8] Platner, Prax. cap. 7. de Visûs Læsione.

[9] P. 83, in 8vo. Tubingæ, 1783. Dissertat. II.

[1] Lib. 14. de Method. Medendi circa finem.

generated.

generated. I have often attempted to draw out the matter in such cases, by means of a curette; but my attempt has been always without success. I have found the matter so thick and glutinous, that the instrument passed through it, without detaching any part of it. And when it has been necessary to make a second incision through the cornea, the cicatrix has always been formed with great difficulty. Meeckrenius recommended the use of a needle in this operation [2]; and Touberville, an English oculist, employed a trocar [3]. But in cases similar to that which I am now describing, all these methods have appeared to me to increase the pain, and to afford no manner of assistance.

The true Hypopion, on the contrary, which follows a violent inflammation of the eye, is often happily relieved by a section of the cornea. And in this last mentioned disease, the

[2] Hiester. Instit. Chir. tom. I. p. 598. fig X. tab. 18.

[3] David Mauchart, Dissertat. de Empyesi Oculi Tubing. 1742.

incision

incision should be made with the same knife which is employed in the operation for the cataract. But I shall describe this more particularly, in a dissertation I mean to publish upon the Hypopion.

SECT. XXV.

Upon the Staphyloma that follows the Operation for the Cataract.

WHEN the eye-lids are first opened, which is usually done about nine or ten days after the operation[4], a portion of the iris is sometimes observed to protrude itself through the

[4] I am fully persuaded that the eyes may be opened much sooner than I have here mentioned, without any danger; and indeed, that it is often useful to do so. See Case XII. I have sometimes observed, that the cicatrix has been formed in less than forty-eight hours. And in those cases, where it is not formed in this space of time, it will not be more completely formed in a fortnight; since the cause that prevents the union, which is a staphyloma, either of the iris, or of the capsule of the aqueous humour, takes place as certainly when the eye is shut, as when it is open. But though I think that the cicatrix is often well formed in the time that I have allowed for this purpose, I am not of opinion that the eye should be then exposed to a strong light. The bandage should be left off; but a shade should be substituted in its place, and only a moderate share of light be admitted into the room.

wound,

wound, forming a sort of hernia; and, sometimes, instead of the iris, a portion of the capsule of the aqueous humour is thus protruded; which capsule is known by its transparent and bluish colour. This last circumstance I have so often observed, that I cannot forbear to express my surprise, that anatomists who have treated of the structure of the eye, should have so long overlooked it, as it proves undeniably the existence of this particular membrane. The pupil, in such a case, preserves both its figure and its size; and when the projection is pierced, a small quantity of the aqueous humour always escapes.

The sensibility of the capsule of the aqueous humour is sometimes so great, that the patient has very little ease so long as a hernia of it continues. The following is a case of this kind: A lady who had gone through the operation of having a cataract extracted (which operation had been tedious and painful) consulted me on account of a tumour on the transparent cornea, which was situated nearly opposite to the pupil. On examining the eye I discovered,

that the obstacles which the oculist, who was a Parisian, had met with, were occasioned wholly by the smallness of the incision which he had made through the cornea; which incision he had finished in a line even with the lower edge of the pupil. The violence which the coats of the eye suffered in consequence of this, while the crystalline was forced through the pupil, occasioned exquisite pain, and was succeeded by a severe inflammation. But the lady, notwithstanding, recovered her sight. So true is it, that there are persons whose cure cannot be prevented, although they be tormented in every possible way. The vigour of the constitution, the strength and soundness of the eye, and the watchful and incessant care of nature for the preservation of the human race, will often support individuals under the effects of the most improper remedies, and carry them through operations that are the most unskilfully executed. A staphyloma of the capsule of the aqueous humour, however, remained, which the oculist had tried, but in vain, to reduce. He had cut it

off

off several times, but it always appeared again the next morning. The basis of the tumour was so tightly compressed by the sides of the wound in the cornea, that it gave the lady very great pain. She had, indeed, enjoyed but little rest night or day, for the seven or eight months that had elapsed since the operation. And though the pupil was clear, black, and round, she could make no use of her eye, on account of its continual watering.

Such a protrusion, either of the iris or of the capsule, of the aqueous humour, through the incision in the cornea, is an accident much less likely to happen after our mode of operating, than after any other. However, as it may happen at any rate, and under the best management, it is my duty to take some notice of it, and to point out the means by which it may be remedied.

Hippocrates and Celsus speak very obscurely of the staphyloma. But all the ancient physicians who mention this disorder, propose remedies for it, which possess a greater or less degree of activity. Galen advised an application of the

juice

juice of cantharides[5]. Paulus Ægineta, and Gui de Chaliac, recommended the lapis calaminaris[6]; Fabricius ab Aquapendente, the unripe fruit of the thymælea, or spurge flax[7]; and Plempius, Armenian bole mixed with alum[8]. There are not wanting authors who even advise the use of the strongest caustics, such as the lapis infernalis[9], and butter of antimony[1]; and Richter assures us, that he has employed them with success[2]. But these applications being attended with some risk, surgeons should not adopt them without the utmost caution.

Woolhouse employed a peculiar method of reducing the hernia of the iris, which he called *emboitement*. He used an instrument made of lead, gold, silver, or some other metal, and con-

[5] De Compos. Medic. lib. iv. cap. 8.

[6] Lib. iii. cap. 22.

[7] Chirur. in fol. Venetiis, 1719, p. 25.

[8] Ophthalm. lib. v. cap. 22. Lovanii, 1659.

[9] St. Ives. Maladies de l'Œil.

David Mauchart, Dissertat. de Staphylomate, Tubing— 1748.

[1] Janin, Maladies des Yeux, p. 394.

[2] Observat. Chirur. fasicul. secund. Gotting. 1776— p. 122.

structed

structed in the shape of the eye. This apparatus, properly oiled both on its convex and concave side in order to prevent an irritation of the eye, he introduced under the eye-lids, in such a manner that it might press the tumour on the cornea[3]. An instrument similar to this, under the name of *moule de platre,* has been used by some practitioners, even after the operation for the cataract. But such instruments must prove highly injurious in every species of the staphyloma; and more especially when it follows the operation of extracting the cataract; in some instances of which kind, I have known it to occasion a suppuration of the whole eye.

The method which is at present most commonly employed for the purpose of reducing this species of the staphyloma, consists in the application of graduated compresses[4]. But

[3] David Mauchart, Dissertat. de Staphylomate. Tubing. 1748.

[4] See Les Remarques sur Dionis, par la Faye, en 8vo. Paris, 1773, p. 547.

Platner, Instit. Chir. tab. 6. fig. 13. en 8vo, 1783. This author has described an instrument proper for the purpose above mentioned.

even

even these have been found very inconvenient, and I am persuaded the reduction of the hernia may more readily be accomplished without them[5].

The mode, therefore, which we adopt in our practice, is to leave the eye perfectly free. And then the motion of the lids will be found to reduce the projection much more speedily as well as more frequently, than graduated com-

[5] The pressure that has been recommended by some practitioners, as a cure for the staphyloma, and which is here objected to by the Baron, is certainly ill calculated to answer the purpose for which it is designed. In consequence of the unavoidable motion of the eye, it is impossible to retain a compress on the projecting part of the cornea so steadily as to prevent it from occasionally slipping off; and when this happens, pressure must rather tend to aggravate than to cure the disease. The only remedy the Translator has found essentially useful in such cases is, as he before mentioned, the causticum lunare; the application of which, two or three times in the course of a week, has evidently and repeatedly produced the best effects; and, he is clearly of opinion, has often much accelerated the removal of the tumour. He begs leave to add, however, in this second edition, that he has lately found the causticum lunare a more active application than he formerly thought it to be. In consequence of this, it may be advisable to use it at first in a state of solution, and to apply it to the part affected on the point of a small camel's hair pencil.

presses can possibly do; and without the inconvenience which usually attend these applications. I have seen many instances of persons who have had cataracts extracted from both eyes at different periods of time, in whom a consequent staphyloma has been cured much sooner, and with less inconvenience, in the eye which has been left at liberty, than in that which has been covered with a compress; and this, even when the disease has prevailed to a greater degree in the former case than in the latter.

When a staphyloma has continued a great length of time, ancient authors advise to carry a needle through its base threaded with a double thread; to tie one of these threads on the right, and the other on the left side of the tumour; and to leave the parts thus embraced in the ligature, until they fall off of themselves. This operation has been recommended by Celsus[6], Paulus Æginetus[7], Aëtius[8], and others; and it was performed nearly in the same manner by

[6] Cap. de Staphylom.

[7] Encheirid. lib. 6. cap. 19.

[8] Tetrabibl. 2. serm. 3. cap. 35. p. 343.

all

all of them. They particularly recommended the operation, when the projection was the effect of ulcers and inflammations in the eye; but in this kind of staphyloma, as well as in that which comes on in consequence of the operation for the cataract, I think it best to leave the reduction of it to the simple efforts of nature. The motion of the eye-lids will occasion the wound to close first of all in the two points where the knife entered and came out of the cornea. Thus a gradual pressure will be made on the tumour, which will make it retire by degrees. In a little time, a new and neighbouring part of the wound will be closed, which will cause another portion of the iris to retreat; and the cure will go on in the same manner, until the whole tumour be completely reduced. In fact, I have seen very few staphylomas that have taken place in consequence of the operation, which did not soon disperse, and in this manner, by the mere action of the eye-lids, where the eye has been left free and uncovered; as, on the contrary, I have seen the reduction of such tumours very much retarded by the various bandages

dages and applications which have been contrived by different surgeons to expedite the cure.

This method succeeds equally well, whether the staphyloma be produced by the iris, or by the capsule of the aqueous humour. In the latter case, however, when the tumour has been of long continuance, I do not hesitate to cut off the projecting bag which is formed externally. This is attended with no inconvenience, and accelerates the cure. It must be observed further, that the capsule of the aqueous humour so readily unites and extends itself after being cut off, that sometimes, even the very day after it has been removed, and the aqueous humour it contained has been discharged, a second staphyloma of a similar kind has been formed in the same place, which must likewise be removed by a similar operation. And this membrane unites and cicatrizes so much more speedily than the cornea, that I have occasionally been obliged to repeat the operation three times in quick succession. It should be remembered, however, that I only recommend it in those cases where the staphyloma is produced by the capsule of the aqueous humour,

mour[9], and is of long standing. In regard to those cases, where the projection is formed by the iris, I leave them to nature, whose operations are always salubrious, and fully competent to the cure of this disease.

[9] Notwithstanding the confidence with which the Author, in this section, and in other parts of his treatise, speaks of the Capsule of the Aqueous Humour, the Translator, having been disappointed in his endeavours to discover it, on dissecting the eyes of a very considerable number of animals of different sizes and species, cannot reconcile himself to the idea of giving to the transparent tumour, which sometimes projects through a wound in the cornea, the appellation of a staphyloma of this capsule. The fact, however, that such a transparent tumour does sometimes project through a wound in the cornea, he does not attempt to dispute; and, in these cases, he is disposed to believe, either that a union takes place between the sides of the wound in the inner lamina of the cornea, previous to the union in its external laminæ, in consequence of which the former projects through the latter, and produces the tumour here described; or else, as he before observed, that the substance secreted through the sides of the divided cornea, to form the connecting medium, becomes inspissated, and is gradually stretched and pressed out by the aqueous humour behind it.

SECT. XXVI.

Upon the various Kinds of Secondary Cataracts.

IT has generally been supposed, that the secondary cataract is situated in the capsule of the crystalline humour. Common, however, as this opinion is, it is not always a just one. For it sometimes happens, that the crystalline, after the principal part of it has been extracted, and especially if it be soft, leaves some portions still behind, which, in consequence of their viscidity, retain their situation, as it were, entrenched within the capsule, and constitute the secondary cataract, of which we are now treating. These fragments cannot always be perceived at the time of the operation; and the patient, immediately after it is finished, may see very well, and the aperture of the pupil appear quite clear. The opacity is preceded by so little pain or inflammation,

flammation, that many days may intervene before it be discovered; and it seems probable, that the opaque particles were prevented from escaping at the time of the operation, by some adhesions they had contracted with that part of the capsule which lay behind the iris. Now this species of the secondary cataract ought not to be confounded with the opacity of the capsule itself; which last is almost always preceded by violent pain and inflammation, and is in general a partial opacity, appearing in some parts of the pupil much whiter than it does in others. Whereas, on the contrary, if the opacity be produced by a portion of the crystalline left behind in the eye, and now, as it were dissolved, and reduced into a kind of thick mucilage, the patient will suffer no pain, the colour of the cataract will be uniform, though less white than before the operation, and it will occupy the whole, or nearly the whole extent of the pupil. In cases of the latter kind, if the incision made in the first operation be closed, it will be necessary to open the cornea a second time, in order to extract the whole of this opaque substance,

by

by means of the curette: for there is no reason to expect that the remnants of the crystalline will dissolve, notwithstanding this has been asserted by many authors, and in particular by Pott[1], and Richter[2][3].

This

[1] Œuvre Chirurgie, Article de la Cataracte, p. 509.

[2] Observations sur le Cataracte, Gotting. 1770, p. 53.

[3] The experience the Translator has had in cases similar to this described by the Baron, and which he calls a lymphatic cataract, has produced in the Translator's mind an opinion very different from that which is here advanced by the Baron. The Translator remembers two cases, in which he operated himself, and in both of which, after the operation, the pupils appeared perfectly clear, and the patients saw distinctly every object presented to them. Notwithstanding this, at the end of a fortnight, when the eyes were opened for the first time, the pupils were observed to be again covered with an opaque matter, which completely destroyed the power of vision. In one of these cases, the opaque matter was wholly absorbed in the course of a week, and the sight was again restored. In the other, it remained three months; at the end of which time, the opacity, without any known cause to produce it, began to be dispelled, and in less than a week, the pupil became perfectly transparent, and the sight as good as it ever is after the most successful operation.

The Translator begs leave to express his sentiments here on another part of the operation, on which the Baron, in the present section, and in many other parts of his treatise, particularly insists. He means a scrupulous care to remove

every

This species of the secondary cataract[4] seems to be produced by a lymphatic matter thickened. I have extracted many such cataracts, and have afterwards found, when they were pressed between the fingers, that they readily dissolved.

I believe them to be formed, as before observed, by exfoliations from the external lamina of the crystalline, and more especially from its

every small opaque fragment that remains in the eye, after the extraction of the cataract. If these fragments can be removed without difficulty, as they generally may, it is unquestionably proper always to accomplish it; but if, from the untractableness of the patient, or the spasmodic action of the muscles of the eye, there be danger of a part of the vitreous humour being forced out during the attempt, he thinks it much safer to leave these minute fragments in the eye, and to trust to the absorbent power of the lymphatic system to get rid of them, than to hazard the ill consequences which the discharge of the vitreous humour is too apt to produce.

[4] The species of cataract mentioned by Dr. Reufs, in a dissertation written by David Mauchart, which was revised by the Doctor and published at Tubingen, in the year 1783, and which he, page 56, calls a membranous and phlegmatic cataract is very different from that which is here the subject of consideration. It was occasioned by a part of the crystalline itself, broken off by the needle either in an attempt to depress it, or in some other way of operating, and which afterwards escaped into the anterior chamber, and there remained.

circumference;

circumference; which parts becoming soft, may be considered as in a state of dissolution. Now, when the operation of extraction is performed on a crystalline thus altered in its structure, these soft parts will not always come away with it, but sometimes remain attached to the sides of the fossula in the vitreous humour, and, though unseen at the time of the operation, afterwards move forwards before the pupil, and again intercept the rays of light. Experience has convinced me that these opaque portions separate from the crystalline during the operation of extraction much oftener than is commonly supposed. I have also found, that by gently rubbing the cornea, after the body of the crystalline is come through, that many such portions may be made to appear in the pupil, which otherwise would remain unnoticed. I therefore never neglect to rub the cornea in this manner; and if, after repeating it several times, and extracting all such portions, the pupil become clear, and no more opacities arise, I then think I have reason to conclude that the crystalline has been wholly extracted, and that

there is no ground to be further apprehensive of a *lymphatic cataract*; by which name I shall distinguish this kind of opacity from the *capsular cataract*. There are, however, some cases in which a lymphatic secondary cataract comes on, notwithstanding the pupil remains clear, after the frictions I have here recommended. This undoubtedly depends upon the viscidity of the remaining portions of the crystalline, and upon their strong adhesion to the sides of the capsule, most probably, in that particular point where the anterior and posterior portions meet each other. I shall now state two cases of this description, premising, however, that such instances occur less frequently than those in which the light frictions above recommended bring forwards the opaque fragments of the crystalline.

CASE XXXV.

In the year 1780, I operated on a woman, who, after the cataract was extracted, distinctly

saw

saw every object that was placed before her. I repeatedly rubbed the fore part of the cornea with the end of the curette, and removed all the opaque particles that then appeared; after which the pupil became perfectly clear. But notwithstanding this care, I found, on opening the lids, after a few days had elapsed, that she was unable to distinguish any object, though the eye had suffered neither from pain nor inflammation. On examining the eye, I perceived that the pupil was again entirely filled with an opaque whitish substance; and I was instantly aware, from the indications above described, that this opacity was not produced by an affection of the crystalline capsule. I waited three months after the first operation, before I proceeded to perform a second; in order that the wound in the cornea might be perfectly healed, and that I might be assured that this opaque substance would not dissipate of itself. As soon as the cornea was divided a second time, the opaque matter presented itself before the incision, and I facilitated its extraction by means of the curette. The pupil immediately

became as clear as after the first operation. I gently rubbed the cornea with the back of the curette; but as nothing more appeared, and the patient distinguished even the smallest objects perfectly well, I closed the eye, and applied the usual bandage. The following day I again opened the eye for an instant, in order to see whether any new opaque matter obscured the pupil, and with a view, if there had been any, to remove it at once. But I found the pupil very clear; and if any of the opaque matter was left after the second operation, it most probably escaped with the aqueous humour, which almost always flows, and sometimes in considerable abundance, for four-and-twenty hours after the operation. In short, the cure was finally accomplished without any accident.

In this instance, the cicatrix of the first incision in the cornea was invisible. I therefore made the second incision in the usual manner, and in the same direction with the former. If, on the contrary, the cicatrix had been considerable, I should have made the second incision upwards; but even the second incision was, in

the present case, so thoroughly healed, that, in a short time, this also was scarcely perceptible.

CASE XXXVI.

In the year 1783, a lady consulted me on account of a cataract in the right eye, and was desirous to have it extracted. The appearance of the eye seemed to indicate the propriety of the operation, and to afford a prospect of its being successful. The crystalline was very white, and covered the whole extent of the pupil. This aperture possessed its native power of moving with the utmost freedom; and she distinguished the day from the night, and the shadow of my hand when I moved it before her. —In the left eye also, there was an opaque substance, which exactly filled the pupil; but this substance was not so white as the crystalline of the other eye, and, upon examining it attentively, it appeared to be situated deeper in the eye than the cataract is usually found. I likewise perceived a cicatrix in this cornea, and from

from hence immediately inferred, that the lady had already gone through an operation, and that the opacity in the pupil was accasioned by some portions of the crystalline, which had at that time been left behind. The grey colour of the opacity confirmed me in this opinion, as likewise the smallness of the wound in the cornea. The lady then acknowledged, that she had undergone an operation on this eye two years before, when the mere process of extracting the cataract alone had lasted more than twelve minutes. I could readily give credit to this information; for an incision so small as that which I here observed was scarcely sufficient to allow the half of a common sized crystalline to pass through it, and would necessarily prevent its opaque fragments from escaping with the aqueous humour, as they would have done if the incision had been larger. The lady assured me that the crystalline was really taken out, and that immediately after the operation, she distinguished objects perfectly; which fully convinced me, that the loss of sight in this eye could have been occasioned only by a lymphatic

secondary

secondary cataract. I therefore encouraged her to hope that the sight of this eye, as well as of the other, might be restored, if she could make up her mind to submit to another operation. She determined upon it; and I began with the right eye. I made the incision through the cornea very large, and, having extracted the crystalline, took great care to remove all the mucous particles that accompanied it. The pupil now appeared black and clear. Being warned, however, by the failure of the preceding operation, I gently rubbed the fore part of the cornea with my thumb, at the same time gently raising and lowering the upper lid; upon which an opaque substance again appeared, which almost filled the whole extent of the pupil, and entirely obstructed the sight. I extracted this mucilaginous substance, and the pupil appeared clear a second time. I then repeated the friction on the cornea with my thumb and the curette, a third time; and, a third time, brought forwards an opaque substance, nearly similar to the former, which I also extracted. After this, though I renewed the

the frictions, I was unable to produce the appearance of any fresh matter; I therefore became satisfied that all the opaque particles were now removed; and this conclusion was established by the event, as the sight of the eye was perfectly restored. I afterwards made an incision, as large as in the former instance, through the cornea of the left eye, and removed with the curette the opaque matter that occasioned the privation of sight. I repeatedly rubbed the cornea, that if any opaque portions remained concealed behind the iris, I might bring them forwards to view; but as I discovered nothing of this kind, I applied the proper dressings, and bound the eye up in the usual manner. The next day I gently opened the eye-lids, and finding both the pupils perfectly clear, I thought myself warranted in giving the lady hopes of a speedy and perfect cure; which, in fact, happily took place, and, by the help of proper glasses, she was afterwards able to read with both eyes.

From this case may be clearly inferred the necessity of rubbing the cornea, in order to discover

cover if any portions of the opaque crystalline be left in the eye, after the extraction of the cataract. Such fragments, if suffered to remain, might destroy the sight a second time, or might, at least, render it necessary to have recourse to a second operation, to which patients, in general, submit much more reluctantly than they do to the first. From hence, also, appears the necessity of making a large incision in the cornea; because in this case, the opaque fragments of the crystalline that may be left behind will sometimes escape, together with the aqueous humour; and in the instance I have just related, if the incision in the cornea of the left eye had been made sufficiently large, it is not improbable that the opaque fragments would in this manner have been discharged.

The cases that have been already stated, as well as many others that might be added, if it were necessary, are directly repugnant to the opinion which is maintained by those who favour the practice of depression, in regard to the dissolution and absorption, both of the depressed

pressed crystalline, and of the milky or viscid matter which often accompanies it[5].

One of the most unfortunate of those accidents which occasionally happen in consequence of the operation of extracting the cataract, is an opacity of the posterior part of the capsule of the crystalline. This sometimes comes on without great pain; but more frequently, it is preceded by exquisite suffering. I have observed, that this secondary cataract takes place most commonly after the operation has been peformed upon children; and in general, it is not perceived until the wound in the cornea is closed. In such a case, the cornea must be opened a second time, and the opaque capsule be removed with a small forceps, (see fig. XI. in the annexed plate). The utmost caution must be used not to touch the membrane of the vitreous humour with the joints of this instrument, nor to lay hold of it at the same time with the capsule[6]. And as the capsule comes through

[5] See the note in page 84.

[6] The posterior part of the capsule of the crystalline lies in

through the cornea, the upper lid must gradually and carefully be dropped over the eye, in order, as much as possible, to prevent the effusion of the vitreous humour; which, however, it is, in many instances, extremely difficult to avoid.

I scarcely need add, that when at any time the posterior part of the capsule of the crystalline is perceived to be opaque during the operation of extracting the cataract, it must by no means be suffered to remain, but must instantly and without hesitation be removed, whilst the wound in the cornea continues open, in the manner explained in this section.

in such close contact with the membrane that covers the vitreous humour, that the Translator believes it to be utterly impossible to engage and extract the former, without at the same time involving the latter.

SECT.

SECT. XXVII.

Upon the Closure of the natural Pupil, and the Mode of making an artificial one.

IT sometimes happens, in consequence of the operation for the cataract, that after the patient has suffered pains, more or less severe, the edges of the iris, which float in the aqueous humour, unite, and thus create a new obstacle to vision. This closure of the pupil, which is occasioned by the inflammation of the iris, and by the suppuration in which it terminates, has always been considered as the most grievous accident that can possibly take place, after the operation of extraction; and the unhappy patient who has the sad experience of it is generally doomed to the total and perpetual loss of sight. This malady, which the Greeks called *Synezesis Pupillæ*, may also be owing to a defect in the original structure of the eye, which, no doubt,

was

was the case of the blind person whom Cheselden restored to sight[7]. Such a native or constitutional

[7] Le Cat, Traité de Sens, Paris, 1784, in 8vo. p. 482.

Morand, dans l'Eloge de Cherelden, Histoire de l' Academie de Chirurgie, Paris, 1778, tom 3. p. 115.

David Mauchart, Dissert. de Pupill. Phthis. ac Syniz. Tubing. 1745, p. 100, curâ et studio Reufs, &c.

" It appears that Cheselden, in order to make an artifi-
" cial pupil, in the case of a young man, the inner edges
" of whose iris were closed, punctured the sclerotica, at
" the distance of about half a line posterior to its union
" with the cornea, with a needle a little longer, and less
" spear-pointed than that which is used in couching. He
" passed it through a part of the posterior chamber of the
" aqueous humour, and when it came nearly opposite to
" the centre of the iris, he turned its point toward this
" membrane, and divided it crosswise. The fibres,
" wounded by the needle, retracted, and an oblong pupil
" was formed transversely, more open in the middle than
" towards the extremities of it, and shaped like the pupil
" of a cat, though in a contrary position.

" Some learned men have entertained doubts whether the
" operation was really performed in the manner it is here
" described, since it is difficult to conceive how an instru-
" ment can be introduced so exactly into the posterior
" chamber of the aqueous humour, as to divide the iris,
" without tearing the membrane of the vitreous humour,
" and entangling the crystalline so as unavoidably to de-
" press it."

For this reason it has been supposed that Cheselden only performed

stitutional disorder of the eye ought not, however, to be confounded with that closure of the pupil which is produced by the membrane which Wachendorf[8] describes, and which commonly disappears in the fœtus at the age of seven

performed the common operation for the cataract *(a)*. The celebrated Haller *(b)* was of this opinion. And Warner, one of the surgeons to Guy's hospital, in London, says, that he never saw the operation for making an artificial pupil, after the manner recommended by Cheselden, performed with success *(c) (d)*.

[8] Commercii. Litter. Norimb. ann. vol. 1740. Hebdom. 18 tom. 1. f. 7, 1744.

Haller, Act. Upsal. ann. 1742.

Zinn, Anatom. Ocul. Human. p. 94, 1755. s. IV.

(a) Voltaire Elemens de Philos. de Newton, vol. 14, in 4to. 1771, p. 190.

M. de Buffon, Histoire Naturelle, in 12mo. tom 4. p. 16, 1752.

Smith, Traité d' Optique, p. 94, liv. i. chap. 5, ann. 1767.

(b) Physiologie, tom. v. p. 519, Lauzanne, 1769, en 4to.

(c) Description of the Human Eye, and its adjacent parts, together with their principal diseases. London, 1775, p. 84, in 8vo.

(d) The Translator sees no good reason to dispute the veracity of Mr. Cheselden in his description of the present case. It was certainly possible for him to succeed in the way he has here mentioned. At the same time, the Translator is of opinion, that the operation proposed by the Baron, which he thinks would naturally occur to every person who prefers the operation of extraction to that of depression, is much more likely to be attended with success.

months,

months, although it sometimes continue to exist even after the birth [9].

Many authors besides Cheselden have advised, in cases of a total closure of the pupil, whether it existed from the birth, or whether it succeeded the operation for the cataract, to make an incision in the iris, either directly through its middle, or else in the shape of a cross [1]. But though the simple incision did succeed in the case of the blind person mentioned by Cheselden, subsequent and repeated operations have proved that the fibres of the iris will close again, after they have been thus divided. My father has had many instances to convince him of this fact; and it is in consequence of these, that in our practice, we employ a different mode of operating. This new method has constantly succeeded with us, and

[9] Haller, Physiol. tom. 5. p. 373, Lauzanne, 1769, in 4to.
M. Sabatier, Traité d'Anatomie, tom. i. p. 534. ann. 1775.

[1] Gendron, Maladies des Yeux, Paris, 1770, in 12mo. tom. 2. p. 196.
Guerin, Maladies des Yeux, in 12mo. Paris, 1769, p. 253.
Janin, Maladies des Yeux, p. 191.

as there is reason to believe it may prove equally successful in the hands of others who apply themselves to this branch of surgery, I shall now proceed to describe it with all the accuracy of which I am capable.

The patient is to be placed in the same position as if he were to undergo the operation of having the cataract extracted; and the cornea knife, described in a former part of this treatise, is to be pierced into the cornea, exactly in the same manner as in that operation. When the point of the instrument has arrived at about the distance of half a line from the center of the iris, it must be plunged into this membrane to about the depth of half a line; and, by a slight motion of the hand backward, it must be brought out again, about the distance of three quarters of a line from the part in which it entered [a]. Then, pursuing the incision,

[a] The size of the opening to be made in the iris, as here recommended by the Baron, appears to the Translator to be much too small. Instead of two thirds of a line (or the sixteenth part of an inch) he is of opinion, that it ought to be at least the eighth part of an inch in diameter, which dimension

incision, as it is before described, in common cases of the cataract, the section of the iris will be completed before that of the cornea, and will present a small flap nearly a line in diameter. This section of the iris, like that of the cornea, will be in the form of a semi-circle [3]. A small scissars is then to be introduced under

mension is not greater than that which a healthy pupil usually has in a moderate light. And when the aperture is made thus large, it will be much more easy to extract the crystalline in case it be diseased, or likely to become so, than when it is smaller.

[3] The portion of the iris which is divided in this operation is never so accurately shaped, as that of the cornea, nor does it exactly correspond with the representation given of it in the plate annexed (see fig. 14). But as it was necessary to communicate my ideas upon the subject, with as much precision and correctness as possible, I thought it my duty to describe the best shape in which it was possible to make the incision through it. I might have made a similar remark when I described the incision, which the cornea knife makes through the capsule of the crystalline. This incision is never so well shaped as that of the cornea; nor indeed is it necessary to be so; since, when the cataract is uncomplicated with other disorders, a wound in the capsule, though small, is necessarily and easily enlarged by the crystalline, in passing through it. I have sometimes seen the muscles of the eye so violently convulsed, that the crystalline, of itself, has burst the fore part of the capsule, before it was opened by any instrument, and has suddenly come through the incision in the cornea.

the flap of the cornea, and the divided portion of the iris is to be cut clean off. By this method an artificial pupil will be made, which, in consequence of the sudden and equal contraction of the divided fibres, sometimes proves to be almost round [4]: and, after this operation, we may rest assured that the pupil so formed, will never close again.

It may sometimes happen, in consequence of the retraction of the fibres of the iris, that it will be difficult to perceive and to cut off the divided flap of this membrane. With a little attention, and dexterity, a small portion of it, however, may almost always be engaged between the points of the scissars; and this portion, whatever it be, should be removed.

[4] In a treatise on diseases of the eyes, published at Montpelier, in the year 1783, by M. Pelier de Quinsgy, this oculist recommends, for the purpose above mentioned of making an artificial pupil, to divide the iris with a bistoury, in a manner not unlike that which I have now described. But as he omits to recommend the removal of the flap in the iris, after it has been thus divided by the bistoury, which appears to me to be a very essential part of the operation, I am of opinion that his mode of operation will succeed in fewer instances than that which I have proposed.

The

The operation I have here recommended differs essentially from that proposed by Cheselden, and must necessarily be much less painful; since the sclerotica, and the other membranes of the eye, which are wounded in the mode he recommends, and which was likewise adopted by Woolhouse, are infinitely more sensible than the transparent cornea divided in our mode of operating. According to Cheselden's method of performing the operation, it appears to me impossible to avoid wounding the crystalline; which, in this case, is very liable to become opaque; an accident which would render a second operation indispensably necessary, in order to restore the sight. On the contrary, according to our plan, the crystalline may readily be extracted at the time when the new pupil is formed; and this, indeed, I always judge most advisable, in order to avoid the inconveniences which an opacity of this humour, under such circumstances, would necessarily occasion.

CASE XXXVII.

M. Buissiere, a native of France, residing in Cork-street, London, consulted my father, in the year 1764, on account of a cataract in the right eye, which began to shew itself about a year before. Soon after the consultation, he was attacked with a most violent ophthalmy in this eye, which terminated in a total closure of the pupil. Being thus wholly deprived of sight, he determined after the cure of the ophthalmy, to put himself under the care of my father, and submit to the operation; who, however, apprized him that it would necessarily be more difficult and more complicated than the operation for the common cataract. The operation was performed in the presence of Mr. Middleton, who, during the war in Hanover, had been a celebrated surgeon in the English army. My father divided the iris at the same time with the cornea, according to the process which I

have

have described above, and without its occasioning any hæmorrhage. The flap of the iris, which was about three quarters of a line in length, withdrawing itself both upwards and downwards, a portion of the opaque crystalline became visible. A pair of fine scissars was now introduced into the anterior chamber of the eye, through the opening in the cornea, and with this a part of the flap of the iris was removed at one stroke. In doing this, no more blood escaped than in making the first section. An artificial pupil was now formed, which had nearly the same extent as the natural pupil. This aperture admitted the introduction of a needle, with which my father destroyed the anterior capsule of the crystalline, now become opaque, and perhaps slightly wounded by the cornea knife. The crystalline afterwards came through with great ease, and was much more opaque than it appeared to be before the ophthalmy. The eye was dressed in the usual manner, and though the operation was very tedious, it is remarkable, that the patient afterwards suffered very little pain, and had no inflammation

flammation at all. The cicatrix of the cornea was quickly formed, and when the lids were separated, the sight was found to be as good as could reasonably be expected after such an operation. It did not seem to be in the least injured by the alteration in the shape and extent of the pupil, which was irregular and immoveable.

When the pupil closes, in consequence of a violent inflammation, like that I have described in the last case, it rarely happens that the crystalline preserves its transparency: and if, by the greatest chance, this humour should still continue transparent, it is in great danger of being rendered opaque by the operation of making an artificial pupil. The natural space between the iris and the crystalline is usually so small, that it is almost impossible to carry the point of the knife through the iris, to make the necessary aperture in it, without, at the same time wounding both the capsule of the crystalline, and also the crystalline itself. And, if this happen, as the crystalline will certainly now become opaque, if it were not so before, it would

would afterwards be necessary to repeat the operation, in order to extract this humour, if the opportunity of doing it was neglected at the time the artificial pupil were made. But it should be observed, that when the closure of the pupil is occasioned by a violent ophthalmy, it rarely happens that the organization of the eye is not otherwise so muth injured, as to destroy all hopes from any operation. This accident, however, more commonly occurs, in consequence of an unsuccessful operation for the cure of the cataract; and, in this latter case, there appears much better reason to expect relief from an artificial pupil.

Again, the pupil, though contracted, is not always closed throughout its whole extent. It more usually happens, that a small portion of it remains open. This derangement of the eye has been called by the antients, *Pythysis pupillæ*, or *Tabes pupillæ*. A patient so circumstanced may still see, if the capsule of the crystalline be not at the same time opaque. The contrary to this, however, is often the case; and this opacity, which constitutes the most

common secondary cataract, when joined with a contracted pupil, as completely destroys vision as if the pupil were entirely closed. In such a complicated case, it would be fruitless to attempt to extract the opaque capsule, without at the same time removing a portion of the iris; for though the pupil might be dilated, by means of a proper instrument, so as to allow this opaque membrane to be taken hold of, yet it would afterwards close up entirely. Besides, the strong adhesion, which the capsule usually forms, in such cases, both with the posterior part of the iris, and with the borders of the pupil, would prove an additional obstacle to such an operation; and, in removing the capsule, it would be almost impossible to avoid wounding the iris also. The operation I have above described is perfectly suited to this complicated disease, as is fully demonstrated in the following

CASE.

CASE.

Colonel Lullin, who resides at Geneva, and is uncle to Messrs. Lullin, bankers in Paris, came here many years ago to have the operation performed on account of a cataract in the right eye. This operation proved unsuccessful, notwithstanding all the care taken by the oculist who performed it. The colonel returned to Geneva, and there remained, until he was afflicted with the same disorder in his left eye; which seldom fails to happen, sooner or later, when the opacity proceeds from an internal cause. In the year 1781, he made another journey to Paris, being determined to try the success of the operation on this eye also. He now put himself under the care of my father. The extraction of the cataract from the left eye was performed according to our usual process, and was attended with as much success as could be wished. M. Lullin again returned home,

home, having recovered the use of this eye. However, soon after his arrival in his native country, even whilst he was on his journey, he perceived his sight to decrease. The eye being examined by a surgeon in the country, a white substance was observed across the pupil, which could be no other than the capsule of the crystalline, now become opaque in different places. As the opacity did not continue to increase, and as the patient still enjoyed some degree of sight, although less perfectly than it was immediately after the operation, my father advised him to continue as he was, and not to hazard a second operation on the same eye. M. Lullin, however, being naturally anxious, if possible, to recover his sight more perfectly, and knowing that my father would not operate on him again in the state in which he then was, sent for an oculist from Berne, who, differing in opinion from my father, tried to depress the opaque membrane by means of a needle. But after repeated attempts, the operator was obliged to relinquish his design, the adhesion of the capsule

sule to the iris being so strong that he found it impossible to separate them.

The state of the patient was now much worse than before; the opacity of the capsule being increased, and the pupil so much contracted, that it would scarcely admit the head of a common-sized pin. In the year 1784, therefore, he came to Paris again, and with uncommon fortitude requested to have a third operation performed. My father, unwilling to refuse him, resolved to enlarge the pupil, and to remove, at the same time, a portion of the opaque capsule. For this purpose he introduced the common cornea knife, in the usual manner, into the cornea, and when its point was brought within the space of half a line of the small remaining aperture of the natural pupil, he plunged it into the iris about the depth of a line; and then directing it into this aperture, continued the incision in such a manner, that a portion of the iris, and also of the capsule adherent to it, was divided at the same time, and formed a small flap; which was afterwards removed

moved with a pair of scissars, and without any loss of blood. It was unnecessary to carry the knife through on the inner side of the cornea, because a very small aperture in the iris was sufficient to constitute an artificial pupil; of which the remaining portion of the natural pupil formed a part. The pupil, thus artificially opened, admitted the rays of light to pass freely into the eye, and was prevented from closing again, by the absence of that portion of the iris which had been removed by the scissars. The patient now enjoys his sight; the pupil, though rather large and somewhat irregular, being still open, as there is every reason to conclude it will always continue to be. The treatment subsequent to the operation was simple; the pain endured moderate; and the cicatrix of the cornea quickly formed. The eye was very little inflamed, and no staphyloma ensued.

The operation of making an artificial pupil, an instance of which I have just described, is not commonly followed by such violent symptoms as might be apprehended. The dressings should be simple, and it is unnecessary to keep the

the eye so long covered as after the extraction of the cataract. The patients on whom I have seen this operation performed, as well as those on whom I have operated myself, were cured without difficulty, and the pain they suffered was by no means insupportable. It has not appeared to me that their sight was more imperfect than that of persons who had undergone the operation for a simple cataract. This may perhaps seem to be incredible to some of my readers, who reflect on the complicated nature of the operation, and the delicacy of the parts concerned in it. But notwithstanding this, I can, with truth, repeat my assertion, that among the great number of operations performed by my father in different parts of Europe, whither I have accompanied him, I have frequently seen him perform this, of making an artificial pupil, with success. It has also succeeded in the few instances of this kind that have fallen under my own care. But after all, I must not forget to add, that the cases which render it necessary very rarely occur.

From what has now been stated, those per-

IV. The cornea knife piercing the cornea obliquely, and introduced into the pupil, to puncture the anterior portion of the capsule of the crystalline humour. A. The edge of the knife. B. The point where the instrument pierces the cornea. C. The point where it enters the pupil.

V. The cornea knife passed through the cornea.

VI. The shape of the incision in the cornea.

VII. The cornea knife employed in making the incision through the cornea upwards. A. Its back. B. The point where the instrument enters the cornea. C. The point where it comes out of it.

VIII. The appearance of the incision when made obliquely upwards.

IX. The gold needle and the curette fixed on the same handle. A. The gold needle. B. The curette.

X. A

X. A small steel hook.

XI. A pair of forceps, to extract the capsule of the crystalline humour, when opaque.

XII. The speculum of Rumpelt, as described by Brambilla.

XIII. The mode of making an artificial pupil. B. The shape of the incision in the iris; which, however, is never so well formed as is here represented. A. The point where the cornea knife enters the cornea. C. The point where the knife comes out of the cornea. D. The edge of the knife.

XIV. The appearance of the eye after a section has been made through the iris to form an artificial pupil. A. The flap in the iris, which, however, is never so well formed as it is here represented. B. The shape of the incision through the cornea.

sons who have unhappily experienced a closure of the pupil, either in consequence of violent inflammation, or of the operation for the cataract, may take comfort, and may indulge a hope of recovering their sight, in case they are willing to submit to an operation. To encourage them with a prospect of such relief, and to assist oculists in the performance of the operation, are the motives which have induced me to publish an account of my father's practice, in this important part of his profession.

FINIS.

likely to be entangled with the iris than the latter, when the aqueous humour is discharged. Notwithstanding this alteration, the back and edge of the Translator's knife form an angle sufficiently acute to allow the instrument to pass through the cornea with perfect ease.

AN

ENQUIRY INTO THE CAUSES

WHICH HAVE MOST COMMONLY PREVENTED

SUCCESS IN THE OPERATION

OF

EXTRACTING THE CATARACT;

WITH AN

ACCOUNT OF THE MEANS

BY WHICH THEY MAY

EITHER BE OBVIATED OR RECTIFIED.

AN

ENQUIRY INTO THE CAUSES

OF

FAILURE OF SUCCESS

IN THE OPERATION

OF

EXTRACTING THE CATARACT.

THOSE professional men, who engage in the operation of extracting the Cataract, are seldom so wholly defective in judgment as to be unable to discriminate between the cases to which this operation is adapted, and those in which it is improper. Nor can their knowledge of the structure of the eye, and of the general rules by which the operation ought to be conducted, be often justly called in question. Admitting, however, that they possess these necessary qualifications, it is yet possible, if they have not had an extensive experience in this branch of surgery, that they may happen to be

inattentive

inattentive, at the time of operating, to some minute circumstances, relative to the operation, which, though apparently inconsiderable, are in their consequences highly important, and which, by a timely attention, might have been so regulated as not materially to interfere with its ultimate success.

In order to impress the mind of such persons with a just sense of the importance of these accidents, I propose in the following pages to give some account of the most considerable of them. And in doing this I mean to class them under the following heads; viz. such as arise,

First, From making the incision through the cornea too small:

Secondly, From wounding the Iris with the cornea knife:

Thirdly, From suffering a portion of the vitreous humour to escape:

Fourthly, From extracting only a part of the cataract, and leaving the remainder behind in the eye:

Fifthly,

Fifthly, From suffering foreign bodies, after the operation, to press unequally on the ball of the eye:

And, Sixthly, From prematurely exposing the eye to the action of too strong a light.

The first accident I propose to consider is that of making the incision through the cornea too small.

It must be obvious to every one, that if the incision of the cornea, through which the cataract is to be extracted, be not somewhat larger than the cataract itself, a degree of violence will be required to bring the cataract through it; and in consequence of this, if the cataract be not altered in its figure, the wound in the cornea will be forcibly dilated, and the edge of the iris which forms the rim of the pupil be compressed between the cornea and the cataract, and be liable either to have some of its fibres ruptured, or to be otherwise so much injured as to excite a considerable degree of inflammation, and ultimately to hazard a contraction or a closure of the pupil.

This

This accident is in general occasioned by the inattention of the operator to the natural unsteadiness of the patient's eye, and by his omitting to use proper means to fix it, at the time that the cornea knife is carried through the cornea. In consequence of this omission, as soon as the instrument has pierced the cornea on the outer side, the eye moves inward toward the nose; and before the point of the instrument can reach the inner side of this tunic, the greater part of it is hid from the operator's inspection; and he is afterwards obliged to continue the incision without seeing what he is about. Hence it often unavoidably follows, that he is under the necessity of bringing the knife through, on the inner side of the cornea, much anterior to its connection with the sclerotica: and sometimes it has been brought out, from the same cause, directly opposite to the pupil.

But the unsteadiness of the patient's eye is not the only circumstance which may cause the incision through the cornea to be made too small. This defect in the operation may arise from

from the inattention of the operator to various other circumstances. It may, for example, proceed from his commencing the incision through the cornea below the transverse diameter of this coat; in consequence of which, notwithstanding the point of the knife be carried properly through the anterior chamber to the inner rim of this tunic, and its edge be afterwards brought down, so as accurately to divide the cornea at its inferior connection with the sclerotica, the incision will still be too small, as it will not take in nine-sixteenths[1] of the circumference of this tunic; which extent the incision ought always to occupy, in order to give the cataract good room to come through it. Formerly, indeed, I was inclined to think it advisable to make the incision through the cornea smaller than is here mentioned, in order with the greater certainty to avoid wounding the iris; but then I always took care to enlarge

[1] By the expression, nine-sixteenths, I mean something more than half the circumference of the cornea.

the

the incision with a pair of curved blunt pointed scissars, before any attempt was made to extract the cataract. I often succeeded very satisfactorily in this mode of operating: but have now long since relinquished it, a greater share of experience having enabled me to secure the iris from being injured, though I make the incision through the cornea sufficiently large, with the cornea knife alone. This mode of compleating the incision with one instrument, and at one time, appears to me greatly preferable to the former mode; such an incision being more likely to be smooth, and to heal by the first intention, than one which is made with two different instruments. I might also add that it is more expeditious; but this is of little moment, if the success of the operation be not at the same time rendered more certain by it[a].

When

[a] In three cases of the cataract which have lately come under my notice, the cornea was not only remarkably flat, but the iris appeared to project forward in the anterior chamber

When the incision through the cornea is made too small, that is, when it does not comprehend nine-sixteenths of the circumference of this tunic, be the cause of the accident whatever it may, this incision should be enlarged, before any further progress is made in the operation; and the enlargement, as I have above mentioned, will be best accomplished by means of a pair of curved blunt pointed scissars. The scissars may be introduced with more ease on the outer side of the cornea, where the knife first punctured this coat, than on the inner side; the incision being generally smoother here than at the place where the instrument

chamber of the aqueous humour, forming a convex instead of a plain surface. In cases of this description, the anterior chamber is so small that if an attempt be made to complete the division of the cornea by one incision, so as to include in it half the circumference of this tunic, it will be found extremely difficult, if not impossible, to carry the point of the knife from the outer to the inner rim of the cornea, without wounding the iris. Under such circumstances therefore I would advise the operator to include only one-third of the cornea in the first incision, and afterwards to enlarge the aperture on the outer side by means of the curved scissars.

came

came out. The operator however should on no account attempt to use a pair of scissars, or any other instrument, whilst the eye is hid from inspection under the upper eye-lid; but should always wait until the cornea be brought fully within his view. From inattention to this circumstance, I have seen a surgeon, whilst enlarging an incision through the cornea, entangle a part of the iris, together with the cornea, between the blades of the scissars; in consequence of which, both these coats of the eye were divided, and a violent inflammation soon ensued, which prevented the success of the operation.

Again; Although the operator carry the point of the cornea knife accurately through both the inner and the outer side of the cornea, yet the incision may be made too small in consequence of his bringing the edge of the instrument through, before it has reached the inferior margin of this tunic, where it is united with the tunica sclerotica. This, though a fault, appears to me to be much less injurious than

than that of bringing the point of the knife out, before it has reached the circumference of the cornea on the side next the nose; since, in general, a wound of this kind affords a much smaller resistance to the extraction of the cataract than one made in the last mentioned way. But if, from either of these causes, difficulties occur in bringing the cataract through, the incision must be enlarged by the use of the curved scissars. It should be remembered that though the incision of the cornea be made sufficiently large to allow the easy extraction of the cataract through it, yet if it be not near the circumference of the cornea, the opaque scar it occasions will be a blemish when the cure is completed: And if it do not extend below the level of the pupil, it will be apt to entangle the edge of the iris, and to alter the figure of this aperture. I was once present at an operation when the incision through the cornea appeared to be accurately made, and to have its full dimensions; but, upon examining it afterwards, the opening into the anterior chamber

chamber was found much too small, and the cataract could not pass through, until it was enlarged by the scissars. In the instance to which I allude, the cornea was remarkably tough, the knife cutting through it with as much difficulty as if it had divided a piece of horn; and, from the apparent scar on the cornea after the wound was healed, it should seem that the cornea was not only tougher, but also thicker than it usually is [3]; and that the knife passed for a considerable distance between the laminæ of this tunic, instead of accurately separating it from the tunica sclerotica around its margin.

In these various ways the incision through the cornea may be made too small; and by the methods I have now mentioned, its size may be enlarged. It is certainly desirable, however, to prevent the accident; and for this purpose the surgeon should particularly attend to

[3] A toughness of the cornea is not an uncommon circumstance; but the toughness is seldom connected with increased thickness of this tunic.

the proper mode of fixing the eye; and should distinguish accurately between the time when pressure may be applied with advantage, and the time when this pressure becomes injurious. A moderate steady pressure may be continued with the most perfect safety on the inner and inferior side of the sclerotica until the point of the cornea knife has passed completely through the cornea, a little above its transverse diameter, and has emerged for a small distance beyond the inner side of this tunic. When this is accomplished, which by some is called the punctuation of the cornea, the design of pressure is answered; and the continuance of it for a longer time would not only be unnecessary but is also injurious. The knife alone will now be sufficient to prevent any improper motion in the eye. The fingers of the operator therefore must be wholly removed from pressing on the eye, and the instrument afterwards be steadily but gently pushed on, cutting its way down, parallel with the plane of the iris, until its edge come out close to the lower margin of the cornea, and has divided, as

above mentioned, nine-sixteenths of the circumference of this tunic [*].

The

[*] In two out of four cases of the extraction of the cataract related by Mr. Sparrow, a surgeon in Dublin, who appears to have paid particular attention to this branch of his profession, it is mentioned that he found it extremely difficult to compleat the incision through the cornea, in consequence of the eye's turning toward the inner angle of the eyelids, before the point of the cornea knife had passed through the inner side of this tunic. Mr. Sparrow adds the following remark, which, though made by him without any such design, appears to me fully to account for the difficulty he describes. He says, "the safest and "best method of securing the eye during the operation is "to have the upper eyelid drawn up by an assistant, while "the operator himself depresses the lower one, *without* "*making any pressure whatever on the globe of the eye (a).*" Baron de Wenzel expresses himself on the same subject in words that have nearly the same signification. Speaking of the mode of dividing the cornea, he says "l'operateur "abaisse en meme temps la paupiere inferieure par le moyen des doigts *index* et *medius*, qu'il tient legerement écartés l'un de l'autre, *et il doit avoir l'attention la plus scrupuleuse de ne faire aucune compression sur le globe, et de le laisser parfaitement libre;* ce qui est le moyen le plus sûr "de diminuer sa mobilité, et de le fixer *(b).*" The opinions of these gentlemen, thus strongly expressed, are widely different from those I have long entertained on this subject,

and

(a) Medical facts and observations, vol. I published by Johnson, London, 1701.

(b) Traité de la Cataracte par M. de Wenzel, fils, à Paris, 1776, 78..

The second accident in this operation, which I shall now notice, is that of wounding the iris with the cornea knife. The principal cause of this accident appears to me to be a premature discharge of the aqueous humour; by which I

and I must still beg leave to dissent from them for the reasons above stated in page 289. But, on the other hand, for the same reasons, I cannot yield assent to the unqualified advice of Mr. Richter; who, though inclined to recommend to surgeons in general the use of specula to fix the eye, yet, with regard to his own practice says, "Digitus ille "qui palberam inferiorem deprimit, comprimit simul pau- "lulum bulbum oculi, et sic illius motum cohibet *(a)*." As Richter does not define the time during which this pressure on the eye should be continued, it appears to me that those who are influenced by his advice are in great danger of continuing the pressure longer than is either necessary or safe. The same objection may be made to a similar advice which was given by the celebrated French surgeon De la Faye *(b)*. My late partner Mr. Wathen is the only author I know who has described the mode of dividing the cornea in the way I have above mentioned *(c)*; and it had been used both by him and by me many years, and in a great variety of cases, before the time that he recommended it publicly to the attention of the faculty.

(a) Observat. Chirurg. fasicul. primus A. G. Richter, Gottingæ, 1770, p. 17.

(b) Memoires de l'Academie de Chirurgerie à Paris, tom. vi. p. 314.

(c) Dissertation on the Cataract by I. Wathen, published by Cadell, 1785, p. 99.

mean, the discharge of this humour before the knife has passed through the cornea low enough to hinder the lower part of the iris, which forms the inferior rim of the pupil, from getting beneath the edge of the instrument.

My meaning will be better understood, if it be recollected that the cornea knife should pierce the outer side of the cornea rather above than below the transverse diameter of this tunic, and about the twentieth part of an inch anterior to its attachment to the sclerotica. It should be carried through the cornea nearly in a horizontal direction, and its point be brought out on the side next the nose, at the same distance from the sclerotica, as it was when it first pierced the cornea. After this the knife should be continued downward, so that the incision it makes may comprehend nine-sixteenths of the circumference of this tunic. The knife, however, being necessarily narrow near its point[1], will have pierced through both sides of the

[1] See a description of the knife I use in a note annexed to the translation of Wenzel's treatise on the Cataract, page 72.

cornea,

cornea, before its lower edge will have advanced so far as the inferior rim of the pupil; and if, previously, in consequence of any inaccuracy in the shape of the knife, or of any unsteadiness in the mode of passing it, the aqueous humour make its escape, the lower part of the iris will fall with it, and will unavoidably pass before the edge of the instrument. This is an accident, which I believe cannot always be prevented by the utmost skill or precaution of the operator. Happily, however, we have been taught that the iris may be reinstated after it has been thus displaced, and without suffering any injury, by applying gentle frictions on the cornea, over the entangled part, with the point of the finger; in consequence of which, this membrane will instantly retract, and resume its natural position [6]. In a few instances, where

[6] "Le plus simple et le plus sûr moyen de ne point "blesser l'iris lorsque cette membrane enveloppe le cora- "tome, c'est de faire des legeres frictions sur la cornée avec "la doigt index, tandis que le doigt medius tient la pau- "piere inferieure abaissée, et de poursuivre l'incision en "laissant le doigt appliqué sur la cornée. On voit sur le "champ l'iris se contracter et quitter l'instrument."

Wenzel's traité de la Cataracte, p. 59.

the

the eye has been peculiarly irritable, I have seen almost the whole width of the blade of the knife enveloped, during the incision of the cornea, by the iris projecting round its edge; notwithstanding which, an attention to the rule above given has enabled the operator wholly to disengage it, and to complete the incision without doing the smallest injury to the protruded part. But it should be remembered that though a gentle friction of the finger on the cornea be sufficient to disengage the iris from the edge of the knife, yet this membrane without care will protrude again as soon as the finger is withdrawn. It is therefore necessary to keep the finger on the cornea, whilst the section of this tunic is going on, and until the knife has passed so low, that the iris is unable to come forward again under the cutting edge of the instrument.

I have said that the premature discharge of the aqueous humour, which is one of the most common causes of a wound of the iris, may be occasioned by a want of steadiness in the operator in carrying the knife through the cornea.

By

By this remark I mean that the knife may not only be suffered to make a punctuation through this tunic, but that its edge at the same time may unintentionally be pressed downward so as to make an incision likewise; in consequence of which downward motion of the knife an aperture must unavoidably be left in the cornea, through which the aqueous humour will escape. It will readily be conceived that if the cornea knife increase through its whole length both in width and thickness, and if it be merely pushed through the cornea, no space will be left through which any fluid can escape [7]. This is what I mean by the word punctuation. But if at the same time that the knife is pushed through to make the punctuation, it be suffered also to cut its way down, it will leave a space above it, as has just been mentioned, through which the aqueous humour will in-

[7] Latitudo laminæ a cuspide ad manubrium, sensim et haud interruptè increscat, ut quo profundius penetrat in cameram anteriorem lamina, sensim latior, eo magis sensim dilatat vulnusculum corneæ, illudque exactè semper occludat, et ita effluendi viam humori aqueo haud concedat.

Richteri Fasciculus primus, p. 21

stantly be discharged; and in consequence of it, a part of the iris will be brought forwards under the edge of the instrument. Now, notwithstanding this accident is not without a remedy, yet as it is still better to avoid the need of recurring to it I would recommend not only to make use of a knife that is accurately constructed, but carefully to confine its action, when first introduced, to the mere punctuation of the cornea. And when the knife has penetrated through both sides of this tunic, and its edge lies clearly below the lower rim of the pupil, it will still be proper to pass it on, and at the same time to give it an inclination downward by a gentle steady pressure, in order to compleat the section as near as possible to the rim which connects the cornea with the tunica sclerotica. If the incision be made by the continued propulsion of the knife, it will be more even and smooth than if the instrument be passed backward and forward in a seesaw direction; and the possibility of compleating the incision in this way will be admitted, when it is recollected that the broadest part of the cornea

knife

knife is exactly equal in dimensions with the semi-diameter of the cornea, and that this is nearly as much of the tunic as is necessary to be divided in the present operation. It may here be objected that if the section through the cornea be made transversely, it will not be easy to compleat it, by the mere progression of the cornea knife, without entangling the point of the instrument in the skin of the nose. A wound here cannot be of any considerable consequence; but even this, trifling as it is, may be obviated by making the incision obliquely, instead of making it transversely: only let it be remembered that in whichever of these directions the incision be made, it ought always to include the largest portion of the circumference of the cornea.

But it has been said that the iris may be wounded by the back of the cornea knife as well as by its edge. Such an accident can only happen through an inaccuracy in the make of the instrument. And on this account, as well as others, I beg leave to recommend to operators, a careful inspection of every instrument they employ, before they begin to use it. The back

of

of the cornea knife requires a particular examination. Although it is requisite to be thin, it should never be allowed to cut above the eighth part of an inch beyond its point. This with the sharp edge of the instrument is fully sufficient to give it an easy passage through the cornea; and if it be thus constructed, enough of the back will still be left blunt to secure the iris from being injured by it.

The third accident in the extraction of the cataract, which comes next under consideration, is that of suffering a part of the vitreous humour to escape out of the eye.

The most common cause of this accident is the undue application of pressure. It may take place either at the time that the incision is made through the cornea, or at the time of extracting the cataract out of the eye. Some eyes are subject to a spasmodic action, which renders them more liable to this accident than others are; but, notwithstanding, if care be taken to avoid the use of undue pressure, I have reason to believe, that, in common cases of the cataract,

ract, the discharge of the vitreous humour will rarely happen.

As to the discharge of this humour at the time the incision is made through the cornea, it must be obvious that if pressure be continued on the eye one moment after the incision through this tunic is compleated, the pressure will be liable to rupture the tender capsules both of the crystalline and of the vitreous humours, and suddenly to force out the former of these, together with more or less of the latter also. It was most probably a dread of this accident that induced the Baron de Wenzel to discourage *in toto* the application of pressure during this part of the operation. But although the reasons above advanced will not allow me to coincide exactly in sentiment with the Baron on this subject, yet I am clearly of opinion that every kind and degree of pressure should be taken from the eye before the knife has completely cut its way through the cornea. And as soon as the knife has proceeded sufficiently low to secure the iris from being wounded by the edge of the instrument, the

the operator, in order more certainly to avoid the counteraction of the upper eyelid, (which if considerable, might injuriously press on the eye,) should not only take heed that his own fingers do not touch the eye, but should also direct the assistant, who supports the upper lid, to remove his fingers entirely from this part[8]. Notwithstanding the upper lid be left thus free, a sufficient space will still remain, between it and the lower lid, to give a full view of the progress of the knife: and, afterwards in compleating the incision, the operator should depress the lower lid with great gentleness, and should be particularly careful, when the cornea is tough, to avoid dragging the eye out-

[8] It is rarely necessary for the assistant who supports the upper eyelid to make any pressure on the globe of the eye: nevertheless where the prominence of the eye, and the space between the edges of the two lids, are sufficient to allow a finger of the assistant to be placed on the inner and upper part of the globe, without interfering with those of the operator, it may be thus used, in order still more fully to fix the eye, during the time that the cornea knife is carried through the cornea; but as soon as the punctuation of this tunic is compleated, the operator should never fail to direct the assistant's finger to be immediately, and wholly removed, as well from the eyelids as from the eye itself.

ward;

ward; from an inattention to which circumstance I once saw the capsule of the crystalline humour ruptured, and the crystalline, together with a part of the vitreous humour, suddenly expelled, although no external pressure of any other kind appeared to be used.

But a portion of the vitreous humour may also be discharged in consequence of an improper mode of puncturing the capsule of the crystalline humour. The part in which it is most desirable to make the puncture of the capsule is in the centre of the pupil; because here the thickness of the crystalline affords the operator a certainty, that the instrument with which the puncture is made, will not pierce through the posterior as well as the anterior side of the capsule. But if, on the contrary, the puncture be made nearer to the circumference than the centre of the pupil, as the crystalline is both thinner and softer in this part, the instrument will be liable to pass through both sides of the capsule, and to pierce at once into the substance of the vitreous humour. In such a case the vitreous humour (which is much

less firm in its consistence than the crystalline, and often almost fluid,) having no longer any barrier to prevent its discharge, is liable to be forced out, in a considerable quantity, by the action of the eyelids alone: and when pressure is afterwards made to bring the cataract through, its quantity will be much increased, and the cataract, instead of coming forward, will recede from the pupil, and either will descend toward the bottom of the eye, or will move to the side opposite to that where the faulty puncture is made. Every attempt afterwards to bring the cataract through, by the application of pressure on the eye, must prove not only fruitless but injurious; and the only way now to extract it is by having the upper lid gently raised by an assistant[9], whilst the operator, either with the fore-finger of the left hand, or with the blunt end of the curette, applied beneath the incision in the cornea, prevents the cataract from sinking lower; then

[9] This is one of the rare instances in which it may be necessary for the operator's assistant to support the upper lid after the incision is made through the cornea.

with

with the right hand let him introduce a hook under the flap of the cornea, and with the point of it carefully entangle the cataract and bring it away. This process of the operation may cause an additional discharge of the vitreous humour; but as it has been attended with success, in several cases that have come under my own observation, I think it ought not to be omitted under the circumstances that have been just described. As prevention of difficulties, however, is at all times better than their cure, I would advise the operator on no account to attempt to puncture the capsule, whilst the eye is concealed under the upper lid, but patiently to wait until he obtains a sight of the whole pupil. The instrument I usually employ to make the puncture is a flat gold pointed needle, arched toward its extremity [1]. In order to avoid

[1] The only difference between the instrument I use to puncture the capsule and that employed by the Baron de Wenzel is this: The Baron's instrument is flat at its extremity, whereas mine is pointed. As to the mode recommended by the Baron to puncture the capsule of the crystalline humour at the same time, and with the same instrument

avoid wounding the iris it should be introduced under the flap of the cornea, with its arched part uppermost, until its point be on a level with the centre of the pupil. The end of the instrument should then be turned inward, and be gently rubbed on the capsule of the crystalline until it pierce through it; which office it usually effects without any difficulty. The operator is made sensible when the perforation takes place, not only by a sensation at the point of the instrument which cannot easily be mistaken, but in general by the discharge of a whitish humour under the cornea. In a few instances I have found the capsule of the crystalline humour so very tough that it would not admit the point of the instrument above described to pass through it [a]; in which case a sharp

ment with which the incision is made through the cornea, this is so hazardous, and at the same time so unnecessary, that I think it needless to take further notice of it here. See a note on the subject in the Translation of Wenzel's treatise on the Cataract, page 105.

[a] Although, in point of firmness, the cornea and the capsule of the crystalline humour usually bear some proportion to each other, yet this cannot always be depended upon. I have

sharp pointed steel instrument of the same diameter, and arched in the same manner as the gold pointed one just mentioned, should be employed. This being much sharper than the other, will, I think, infallibly enable the operator to accomplish the intended purpose.

A portion of the vitreous humour may also be discharged at the time of extracting the cataract out of the eye: and when it happens at this time, as well as when it takes place at the times that have been already considered, I am of opinion that the usual cause of the accident is an undue application of pressure. Without adverting here to the application of violent pressure, where the incision through the cornea has been made of its proper dimensions, (which pressure in such a case is unnecessary as well as highly improper,) if the incision be made at first too small, and if the operator omit to en-

I have sometimes found the capsule tough, when the Cornea has been divided with great ease; and, at other times, after having experienced a great resistance to the knife as it cut through the cornea, I have punctured the capsule with the gold pointed needle without any difficulty.

large it in the way I have described page 285, the cataract cannot be brought through the wound without the application of such pressure: And if the pressure be continued one moment after the cataract is extracted, the capsule of the vitreous humour will unavoidably be ruptured, and in consequence of it, the cataract will instantly be followed by a greater or a less portion of this humour. Pressure so continued is liable to rupture the capsule of the vitreous humour even before the cataract is brought through the incision in the cornea; and in this case, as has been before observed, a portion of the vitreous humour will be discharged on every repeated attempt to extract the cataract; whilst the cataract itself will resist them all, and will plunge deeper in the eye. Such an accident can only be rectified by first enlarging the incision in the cornea, and then extracting the cataract by means of a hook, in the way that is described, page 304.

It should be remembered that in cases the most favourable, when the incision through the cornea is made of its proper size, and the de-

gree

gree of pressure, applied to extract the cataract, is adjusted in the best manner possible, the cataract rarely comes out of the eye, at once, in a state so complete as not to leave some portions behind, which require to be afterwards extracted. Sometimes, when the cataract is soft, a considerable portion of it is thus left; and at other times, when its consistence has been firm, I have found it broken into two parts, nearly equal in size, one of which only has come through at first, and the other has required to be afterwards extracted by means of the curette or little spoon. It has occasionally been necessary to introduce this instrument several times, before the whole of the opaque matter could be extracted, so as to leave the pupil quite transparent. Great care is required in conducting this part of the operation, in order to hinder the posterior part of the capsule of the crystalline from being ruptured by the end of the instrument; which accident would immediately open a way for the discharge of the vitreous humour.

A discharge of the vitreous humour may in-

deed take place, after the extraction of the cataract, merely in consequence of a spasmodic action in the eye-lids, without any undue violence being done to the capsule, by the instruments that are employed. I was present a few years ago at the performance of an operation where this accident happened. At first I suspected that the end of the curette had been pushed through the posterior side of the capsule, in the way above mentioned, but afterwards I think I had reason to doubt the justice of this suspicion. The incision through the cornea, in the instance to which I allude, was made with great accuracy, both as to its size and situation; and the bulk of the cataract was extracted with equal care. A small opaque substance, however, being afterwards visible behind the pupil, the operator desired his assistant to raise the upper eye-lid, that he might introduce the curette to remove it. Both the operator and his assistant appeared to perform their respective parts, with care and steadiness. But no sooner was the opaque portion removed than a very considerable discharge of the vitre-

ous humour instantly followed; and on the patient's opening his eye, a short time afterward, another portion of the same humour gushed out. This accident might certainly have been occasioned by the passage of the end of the curette through the posterior side of the capsule of the crystalline; but as the operator was perfectly collected, and took particular care to avoid this accident, and as the patient's eye, though irritable, was fully within the operator's view at the time the curette was introduced, I am rather disposed to believe that the strong contraction of the upper eye-lid, increased by the endeavours of the assistant to keep the lid from falling, caused so great a pressure on the ball of the eye, as to produce the rupture of the capsule which gave room for the discharge above mentioned. Whatever be the opinion we entertain as to the cause of this accident, the case here stated tends to establish the propriety of a rule which I laid down on a former occasion, and constantly observe in my own practice, viz. that, after the incision through the cornea is compleated, in all the subsequent parts of the

operation, " the upper eye-lid should be raised " solely by the fingers of the left hand of the operator[3]." This may be done by him with much more ease, and with greater accommodation to the involuntary action of the eye-lids, (which is considerably greater in some cases than it is in others,) than it can be by those of any assistant whatever. And whilst the upper lid is thus supported by the fingers of the left hand of the operator, the middle finger of his right hand is fully sufficient to depress the lower lid; and with the thumb and fore finger of the right hand, the curette, or any other instrument that is required may be held, and be applied to the eye with perfect steadiness and freedom[4].

I am

[3] Chirurgical Observations relative to the Epiphora, Extraction of the Cataract, &c. by J. Ware, page 63.

[4] In a note, page 290, I have remarked that in two of the four cases related by Mr. Sparrow of Dublin *(a)*, he found it difficult to accomplish the incision through the cornea on account of the strong disposition of the eye to turn toward the inner angle of the eye-lids. I have now to remark that in the two other cases, the cataracts were suddenly expelled

(a) Medical facts and observations, Vol. I. p. 49.

without

I am aware that the discharge of the vitreous humour, even in a considerable quantity, is not always fatal to the success of the operation; and perhaps if this could take place without making any derangement in other parts of the eye, it might tend to diminish pain and inflammation, rather than to increase these symptoms. But the misfortune here is, that when the capsule of the vitreous humour is once ruptured, this humour flows out so freely, and on the application of so small a degree of pressure, that the operator cannot afterwards inspect the eye with sufficient accuracy to determine, whether all the fragments of the cataract are removed, so as to leave the pupil quite clear; or whether the whole of the iris has resumed its position,

without any known pressure on the eye, either by the surgeon, or by his assistant; and in one of these a considerable portion of the vitreous humour escaped with the cataract. Now, although all these cases proved successful under the management of Mr. Sparrow, yet I believe it will be admitted that the sudden expulsion of the cataract is an accident which it is highly desirable at all times to prevent; and I have not once met with it, in a very considerable number of cases, since I have adopted the mode of practice above recommended.

so as to give this aperture its proper figure. An inattention to these circumstances appears to me to have been much oftener the cause of the untoward symptoms, which sometimes have followed this accident than the mere discharge of the vitreous humour; which humour, as is well known, admits of a speedy regeneration: whereas if any part of the inner margin of the iris that forms the rim of the pupil be turned outwards during the extraction of the cataract, and remain long in this unnatural position, or, if any part of the cataract itself lodge between the edges of the divided cornea, and prevent them from closing by the first intention, they are sufficient to excite a violent inflammation of the eye; and this most probably will terminate either in a contraction of the pupil, or, as I have sometimes seen, in a suppuration and consequent sinking of the whole organ.

The fourth accident in the operation, of which I am next to treat, is that of extracting only a part of the cataract, and leaving the remainder behind in the eye.

It

It is necessary for me here to distinguish between a solid part of the cataract broken from the rest, and left in the eye, and those soft and nearly fluid portions of it, which form its rim or circumference, and which, in almost every instance, separate from it, in a greater or in a smaller quantity, as the cataract comes through the incision in the cornea. The former of these being of a firm consistence, is much less likely to be dissolved by the aqueous humour than the latter; and I am of opinion that this ought always to be extracted. The latter I also think it advisable to remove, in order that the pupil, at the time of the operation, may be made perfectly clear, unless particular circumstances occur to render this improper; and the most powerful objection to the practice is, that extreme degree of irritability to which some eyes are subject, which renders the introduction of every sort of instrument, after the cataract is extracted, not only difficult but hazardous. I usually remove opaque portions of the cataract by means of a curette, or small scoop, the end of which being introduced under the flap of the cornea,

cornea, and carried behind them, will, when withdrawn, bring them forwards out of the eye. Sometimes I have had occasion to introduce the curette a great number of times; and, occasionally, when the opaque portion has been large, and has adhered to the capsule, I have been obliged to extract it with a small forceps. Before the operation is concluded, it is always advisable to rub the end of the finger gently on the fore part of the eye, over the eye-lids; which process contributes to bring within sight some opaque portions that may have lien concealed behind the iris during the operation, and if unremoved, might afterwards come forwards, and intercept the light in its passage to the seat of vision. These, like the portions before mentioned, should be taken away, by means of the curette or forceps. Instances indeed may offer, as I have just observed, in which these instruments cannot be employed without danger; but they occur very rarely, and will be still less frequent if the operator take the care of the upper eye-lid into his own hands, and adjust with accuracy the degree of pressure that

is necessary to keep the lid suspended. A case of this kind however has lately fallen under my own observation. I extracted a cataract from a man whose eye was so extremely irritable, that after the incision through the cornea was compleated, it was in a constant rolling motion, not only on every attempt to touch it with an instrument, but even on separating the lids to look at it. In this instance, after the bulk of the cataract was removed, which though small was perfectly round, I thought it best, as the pupil preserved its proper shape, to desist from doing more, notwithstanding so much of the soft part of the cataract remained in the eye as to cause the pupil still to appear very obscure, and to prevent the patient from accurately distinguishing any object that was placed before him. On the fifth day after the operation I inspected the eye, and found the pupil still obscured by an opaque substance, which seemed now to protrude through it into the anterior chamber of the aqueous humour. The inflammation was inconsiderable. At the end of a fortnight, as the opaque substance still continued

ed to fill the aperture of the pupil, I directed a mixture, of one part æther and three parts distilled water, to be applied to the eye three times every day, by means of a camel's hair pencil. This gave at first an acute pain, but it soon went off. After using the æther thus diluted for three days, I dropped a drop of it unmixed into the eye. It gave considerable pain and excited an increase of inflammation; but they went off in the course of the next day by the use of a weak saturnine lotion. On the third day the æther was again applied; and on the fourth I had the satisfaction to perceive a small portion of the upper part of the pupil perfectly clear. I repeated the application regularly every second day, and sometimes every successive day, when the inflammation was not too great to admit of it. Under this treatment, the opacity of the pupil daily diminished, and at the end of five weeks from the time of the operation, the whole of this aperture resumed its natural appearance, and the patient recovered his perfect sight.

I here beg leave to make a remark on the extraction

extraction of the capsule of the crystalline humour. An opacity in this capsule is the only reason that can at any time render the removal of a part of it necessary; and this is a very uncommon occurrence, unless it has been preceded by inflammation, and is accompanied with other symptoms which warn the operator of the circumstance before he begins the operation. The anterior part of the capsule can alone become the object of the operator's attention; its posterior part is necessarily hidden whilst the cataract remains in the eye; and afterwards, if it be discovered to be opaque, it is so closely connected with the capsule of the vitreous humour, that I believe it cannot be removed by any instrument, without hazarding a destructive effusion of this humour. The anterior part of the crystalline capsule lies more fully however within our inspection; and when an opacity of this part accompanies an opacity of the crystalline humour, it usually shews itself by irregular opaque spots or lines visibly situated on the anterior surface of the opaque crystalline. The crystalline humour may indeed

deed continue transparent, notwithstanding the anterior part of the capsule be opaque; but an opacity of the capsule is more commonly accompanied with an opacity of the crystalline also. When an opacity of the capsule is the consequence of violence done to the eye, as of an attempt to depress the crystalline, or, when it proceeds from an internal inflammation of this organ, an adhesion not unfrequently takes place between the anterior part of the capsule and the posterior surface of the iris; which adhesion usually occasions a contraction of the pupil, and prevents this aperture from dilating and contracting with so much freedom as it ought, and as it would do, if the iris were unconfined. Such a state of the eye appears to me to be a very stong objection to the performance of any operation, since the degree of the adhesion cannot be ascertained; and when the adhering parts are separated, the violence which must unavoidably be done to the iris, by the passage of the crystalline humour through the contracted pupil, will strongly dispose this aperture to contract still more, and

perhaps

perhaps may cause it to close entirely. If, however, from the symptoms above described, there be reason to believe that the opaque crystalline is accompanied with an opacity in the anterior part of the capsule, and if the aperture of the pupil has not wholly lost its power of dilating and contracting, an operation may sometimes, notwithstanding, be advisable; but in these cases it would be vain to expect success from the removal of the crystalline humour, unless a perforation be made in the opaque capsule also[s]; and when this last is necessary, it should

[s] It is not unusual with medical men to speak, nor has it been unusual with medical authors to write, in a very unqualified manner, concerning the extraction of the capsule of the crystalline humour: from which inaccurate mode of expressing themselves we might be led to imagine that the capsule might be taken away with as much ease as the crystalline humour itself. This however is a very mistaken idea. The capsule of the crystalline humour, in an undiseased state, is strongly attached both to the extremities of the ciliary processes, and to the capsule of the vitreous humour; and these attachments are very rarely separated by the formation of the cataract, or by an opacity in the capsule itself. Although the capsule completely surrounds the crystalline humour, and contains this humour floating within

should always be accomplished before any attempt is made to dislodge the crystalline which the capsule contains. This part of the operation I would recommend to be performed in the following manner. The cornea being divided in the same way as if the opaque crystalline alone was to be extracted, and the incision comprehending, as I have repeatedly recommended already, nine-sixteenths of the circumference of this tunic, a fine pointed instrument, somewhat

within it, in a kind of aqueous fluid, yet the two parts are as distinct from one another as a nut-shell is from the nut it contains. The capsule of the crystalline, like the crystalline itself, is of a lenticular shape, having an anterior and a posterior portion; but these do not seem to be strictly similar to one another. Both are equally transparent; but the anterior part is of a firmer texture than the posterior; and the posterior part is the only one which I have hitherto seen injected. The vessels of this posterior part are derived from an artery which passes through the centre of the optic nerve, and is continued through the middle of the vitreous humour to be distributed upon it. In a few instances I have seen the opaque crystalline escape from the eye whilst contained within its capsule; but, when this has happened, if the eye has not been generally diseased, it has been owing to the application of too much pressure; and it has generally been accompanied with the discharge of a part of the vitreous humour also.

smaller

smaller in size than a round couching needle, and a little bent towards the point, should be introduced under the flap of the cornea, with its bent part upward, until its point be parallel with the aperture of the pupil; the point should then be turned toward the opaque capsule, which is to be punctured by it, in a circular direction, as near to the rim of the pupil as the instrument can be applied without hurting the iris. Sometimes the part included within the punctures may be extracted on the point of the puncturing instrument; but if this cannot be done, it should be taken away by means of a small forceps. After the perforation of the capsule is compleated, the crystalline humour may easily be extracted, in the way I have above mentioned, by making a slight pressure with the curette, either above or below the circumference of the cornea. It is necessary to extract this humour, whether it be found opaque or transparent; since, if it be opaque, it will necessarily intercept the rays of light, though the capsule be removed; and if it be transparent, there is great reason to fear that the re-

peated punctuation of the capsule may destroy this transparency[6].

The next accident, of which I am to treat, is

[6] The Baron de Wenzel recommends an operation, in cases where the anterior part of the capsule is perceived to be opaque, somewhat different from that which is above described. He says in his *Traitè de la Cataracte*, page 93,— " Apres avoir fait la section de la cornée, on n'incise point " la crystalle anterieure, comme dans les cas ordinaires; " on substitue au ceratome de petits pinces qu'on introduit " dans la pupille; on saisit legerement la capsule avec leur " extremité; on la detache successivement dans toute la " circonference des adherences qu'elle peut avoir con- " tractée avec les parties environnantes, et on fait en sorte " de l'enlever en entier." The Baron adds, " Cette pra- " tique nè m'a jamais paru entrainer de grandes difficultés " dans les malades que j'ai operé de semblables cataractes." This advice, however, deviates very widely both from the precept and practice of his father; who, in the year 1779, I remember to have seen remove a considerable portion of the opaque capsule, precisely in the way I have above recommended; and at the time of the operation he informed me that in similar cases he always proceeded in a like manner. The father's mode appears to me to be preferable to that which is recommended by the son; since the capsule not only forms a complete bag to contain the crystalline, but is often so strongly attached, round its rim, to the extremities of the ciliary processes, that it would require no small force to remove a portion of it with a forceps, unless this portion were first, in some degree, detached by means of the puncturing instrument above mentioned.

that of suffering foreign bodies of any kind, after the operation, to press unequally on the globe of the eye. Under this head I propose to consider, —the intervention of the edge of the inferior eyelid between the sides of the divided cornea;— the inversion of the edge of the inferior eyelid; —and the lodgement of one or more loose eyelashes on the globe of the eye.

I must here beg the reader to recollect that there is a concavity in the shape of the inner side of the eyelids, which answers exactly to the convexity of the globe of the eye; and that these two parts, when the eyelids are shut, lie in close apposition to each other. Hence it will readily be conceived that if the eye be turned downward, whilst the divided flap of the cornea is loose; or if the lower eyelid be suffered to return suddenly to its natural position, whilst the eye is inclined downward; in either of these cases, the eyelid will be liable to rumple the cornea, and to get between the sides of the wound. Whoever has been much accustomed to the operation of extracting the cataract must have observed that this takes place,

not unfrequently in performing those parts of the operation which are subsequent to the incision of the cornea. And if, after the operation is ended, the eye unfortunately be left with the edge of the lid against the iris, the cornea at the same time being rumpled, and a large space left open for the continual discharge of the aqueous humour, an inflammation of the most violent kind must unavoidably and speedily ensue. On this account I cannot too earnestly recommend to every operator, previous to the application of dressings to the eye, carefully to depress the lower eyelid with his finger; and, before he suffers the lid to rise, to take care that the flap of the cornea be accurately adjusted in its proper position, and that the upper lid be dropped so as completely to cover it. The dressings are then immediately to be applied[7]; nor do I think it right after this to open the eyelids again, until there be good reason to suppose that the wound in the

[7] For a description of those which I usually employ see a note annexed to the translation of *Wenzel on the Cataract*, page 219.

cornea is perfectly closed. This may indeed take place within the first twenty-four hours, but I believe no one can absolutely ascertain that the union is compleat in less than three or four days; and sometimes the wound has continued open for a much longer time.

Again; the edge of the inferior eyelid is liable to be inverted, as well as to insinuate itself under the flap of the divided cornea; and the inversion may take place not only at the time of the operation, but afterwards also during the time that the eyelids are kept shut. In some instances the propensity of the edges of the lids to become inverted is perceptible before the operation is performed; and when perceived it ought always to be previously rectified. It is a fortunate circumstance that the lower eyelid is more commonly affected in this way than the upper eyelid; since an inversion of the edge of the former may be remedied with much more ease and with much greater certainty than an inversion of the edge of the latter. When the inversion is recent, its cure may sometimes be accomplished by bathing the loose

loose skin of the lid with a solution of alum, and afterwards making a large fold in the skin, and preserving the fold by the application of a strong adhesive plaister over it; extending the plaister down for a small distance over the cheek, in order to make its hold the more secure. But when the inversion has continued a great length of time, I have usually been obliged, with the same intention, to cut off a transverse portion of the skin just below the edge of the lid, and afterwards to confine the sides of the wound together, by means of two or three sutures; which mode, in repeated instances, has effectually answered the intended purpose[8]. An inversion of the edge of the eyelid may indeed take place after the extraction of the ca-

[8] As the friction of the eyelashes against the globe of the eye is the chief cause of the injury which an inversion of the eyelids is apt to produce, an accurate extraction of the eyelashes, by means of a small pair of forceps, on the day previous to the operation for the cataract, may perhaps prove sufficient to prevent the inversion from doing any injury to the eye; but it must be evident that this will only prove a partial cure, as on the reproduction of the lashes all the symptoms they produce will necessarily return.

taract,

taract, although no tendency to this disorder were observed previous to the performance of the operation. I do not believe, however, that this accident often occurs; but with a view to obviate the inconveniences to which it may give rise, I would advise to draw the skin of the lower eyelid down as often as the dressing on the eye is renewed; and if, from the appearance of the lid, and the pain experienced by the patient, there is reason to apprehend that, after the edge of the lid has been everted, it speedily again assumes its inverted position, the patient should be directed to apply his finger as constantly as he can to the skin on the edge of the orbit, in order to counteract the morbid propensity. I was once obliged, in a case of this kind, to remove a portion of the skin below the lid, within a few days after the cataract was extracted, and afterwards to connect the sides of the wound together by means of two sutures in the way I have above mentioned. This operation succeeded to the full extent of my wishes. The patient was instantly relieved from

from the pain which the inversion occasioned, and in about a fortnight from the time that the cataract was extracted she recovered her perfect sight.

It has lately been said that a long continued use of bandages will cause an entropium. If by the words "long continued" be meant only their continuance for about five days or a week, (which I believe is the full extent of time that the late Baron de Wenzel continued them for many years before his death, or indeed, that the present Baron recommends them to be continued, in his treatise on this subject,) I must take the liberty to say that the experience I have had inclines me to entertain a different opinion on this subject. In a few instances, as is above observed, I have seen an inversion of the edge of the lower eyelid take place shortly after the operation was performed; but, if I recollect rightly, all who suffered from this cause were persons advanced in life, and their eyelids particularly loose and flaccid. On this account I am inclined to believe

lieve that the edges of the eyelids would have been still more forcibly contracted, if their eyes had been exposed to the light during the state of irritation in which this organ usually is for a few of the first days after the operation, than they were whilst defended from it by a thin cover.

I beg leave to add that within a short time I have been consulted by two old gentlemen, each of whom had a cataract fully formed in one eye, and a similar opacity advancing in the crystalline humour of the other; and in both of these, the edge of the lower eyelids not only shewed a disposition to this disorder, but was actually always inverted unless kept out by the finger. It is remarkable that one of these gentlemen had suffered so little inconvenience from the inversion of the lid, that he was ignorant of it when he first applied to me; the application being made solely on account of the dimness of his sight. But, notwithstanding this, I shall certainly think it my duty in both cases to remove the inversion before I proceed to extract the cataracts.

Besides

Besides the danger to which the eye is exposed, after the operation, from the inversion of the edge of the lid, the eye may receive injury from the improper position of the eyelashes alone; one or more of which, during the operation, may happen to bend inwards; or, becoming loose, may afterwards insinuate themselves between the inside of the lid and the globe of the eye. I have been a witness to both these accidents; and it must be evident, if they be suffered to remain unrectified, they will produce the worst effects. They too often arise from the incautious manner in which the upper lid is supported by the operator's assistant. In those cases, for instance, where the eye is situated deep in the orbit, it is often necessary for the assistant to apply his finger to the very edge of the lid, and to confine this part against the frontal edge of the bony orbit, in order to hinder the lid from falling. Now in doing this, if he be not careful to keep the eyelashes perfectly straight, his fingers will be apt to bend them; and, if they be but slightly attached, he will, perhaps, draw them out by their

their roots. A recollection of the possibility of these accidents will not only teach the assistant to be cautious in his mode of supporting the upper lid, but will impress on the operator the importance of examining the eye carefully, after the operation is finished, and of removing every foreign particle lodged within the lids that is in the least degree likely to give pain or increase inflammation. If an eyelash be bent inward, it should be replaced in its proper position; and if it be broken off and lie loose on the ball of the eye, it should be removed by means of a small forceps.

The last accident attending the operation, which I propose to consider at this time, is that of prematurely exposing the patient's eye to a strong light. The slightest consideration will convince the reader, that though the operation be performed in the best manner possible, and though it succeed in every part to the utmost extent of the operator's wishes, still it must excite in the eye a degree of irritability which strongly disposes it to a state of inflammation. The ophthalmy very often does not come on until

until three or four days after the operation, at which time some degree of it is usually expected after other operations as well as after this. Until such a portion of time has elapsed, no one can ascertain to what a height it may proceed; and, until this period, it appears to me peculiarly desirable to avoid the application of every stimulus that has the smallest tendency to increase it. The common light is a stimulus only when it is applied to a weak eye. A sound eye not only bears it, but is pleased with it; whereas an inflamed eye, which is usually weak also, naturally shuns it. Immediately after the extraction of the cataract, light gives no pain to the patient; and probably it would not give a great deal for a day or two; but notwithstanding this, as the eye is now in a state of irritability, and as it is liable, about the third or fourth day, without any additional cause, to suffer from an increase of inflammation, I cannot but think it imprudent to increase the risk of it, in the mean time, by an unnecessary exposure.

Another

Another objection to the practice of opening the lids within the first two or three days after the operation, is derived from the danger of disturbing the wound in the cornea before this is entirely closed. It is not easy to ascertain the exact time when a union between the sides of the wound takes place; but if a comparison be made between the process of nature here, and that which takes place in other operations, where a union between divided parts is required, it cannot be supposed that this union will be compleat in less than two or three days, at least; and sometimes it may require a much longer time. Although the friction of the eyelid against the sides of the wound may not be sufficient, at an earlier period, so to open or widen the wound as to allow the edge of the lid to insinuate itself into it, (which would have happened immediately after the operation,) yet this friction may interfere with its speedy and compleat union; it may cause the aqueous humour to pass through the wound longer than it otherwise would do; and of course

course it may keep the anterior chamber longer empty. From the same cause also, a portion of the inferior part of the iris is liable to be pushed through the wound, together with the aqueous humour; whereby the round figure of the pupil may be altered, and sometimes a staphyloma be induced; which circumstances will contribute to keep up the inflammation for a considerable time longer than it would have otherwise remained.

The practice of examining the eye on the day after the operation of discharging the matter contained within the cornea, in cases of the hypopion, has been urged as an argument for a like treatment after the operation of extracting the cataract. But it should be remembered that these two operations differ in many material respects. In the operation for the hypopion, it is rarely necessary to make the incision through the cornea so large as it is in that for the cataract; nor is the derangement of the internal parts of the eye so considerable in the former as it is in the latter. And, besides,

sides, in cases of the hypopion, the inspection of the eye, on the day after the operation, is necessary in order to enable the surgeon to obviate evils which may reasonably be expected at that time to occur; but in cases of the cataract, no possible advantage, so far as I have been able to learn, can be derived from this practice, unless extraordinary symptoms call for it; and on the contrary, material injury is to be apprehended from it.

I should be sorry, however, to have it inferred, from what has been here advanced, that I am an advocate for long confinement after the operation. This unquestionably was continued by former operators for a much longer time than we now know to be necessary. But in avoiding one extreme surgeons should be careful that they do not err by running into another. The mode I always follow in my own practice, unless particular circumstances call for a variation, is this: The patient is kept wholly in bed, and directed to move his head as little as possible, for the first two days after the operation.

During

During this time a dossil of wet lint is kept on his eyes, covered with a saturnine plaister; and this is prevented from slipping, by a thin bandage carried round the head, and pinned to his night cap. The dressing is renewed once every day, and the outside of the eyelids washed with water; which is applied warm in winter, and cold in summer. At each time of dressing, the skin of the lower lid is drawn gently down, in order to counteract the disposition which this part sometimes acquires to turn inward on the eye. During this time the use of animal and solid food of every kind is forbidden; and soft puddings, gruel, and thin drinks, are substituted in their place. The patient is also desired to talk as little as possible with those who attend him. On the third and fourth days he is permitted to sit up for two or three hours, and if he has had no stool since the operation, a mild opening medicine is now administered. On the fifth, the time of his sitting up is lengthened; and now, presuming that the wound in the cornea is completely

pletely closed, I usually examine the state of the eye. After this the dressings on the eye may be left off during the day, particular care being taken to defend it from a strong light by the use of a pasteboard hood or shade, and by darkening the room to such a degree, that the patient feel no inconvenience from it. He may now also be permitted to look for a short time at large objects; but the operator will not have occasion to be earnest in advising this, as it will follow of course, as soon as the patient is able to bear it. The treatment afterwards will very little interfere either with the comfort or wishes of the patient, unless unexpected accidents should render a variation necessary. Many on whom I have performed the operation, have been perfectly well in less than a fortnight; and in a great variety of cases, the instances are extremely few in which the inflammation has continued so long as a month. The mode of treatment above recommended will not be thought rigorous, nor the confinement tedious, when the importance of the object which these are calculated to promote is

taken fairly into the account; nor do I believe that this object can be safely attained in any easier way[9].

[9] It may be proper to add, that I usually give the patient a purge on the day previous to the operation, in order that his bowels may be less likely to disturb him for two or three days afterwards. And, if he be of a plethoric habit, eight or ten ounces of blood should be taken from his arm immediately after the operation is performed.

MEMENTOS

MEMENTOS FOR THE OPERATOR

IN EXTRACTING THE CATARACT.

Upon a careful review of the preceding enquiry, at the distance of nine years from the time when it was first published, I find very few of the observations, and these of small importance, which I think it necessary either to retract or alter. As the title to it expresses, it is intended to answer two purposes; to point out the accidents to which surgeons are liable in the operation of extracting the cataract, and the means by which such accidents may either be obviated or rectified. If, in connection with this enquiry, the reader will take the trouble to peruse the Baron de Wenzel's valuable treatise on the Cataract, I believe I may venture to say that the two, taken together, will afford him an account of all that is yet known on the present subject. Having, however, for many years, made it a rule to peruse the following list of mementos, (which may be consi-

dered as an epitome of the two preceding publications,) on the morning of every day, in which I was engaged to perform the operation, and conceiving it to be of considerable moment that these mementos should be fixed in the mind of every one who undertakes to perform it, I flatter myself I shall not render an unacceptable service to the reader if I introduce them in this place. To each of the mementos a brief reason will be subjoined for the advice that it contains; but as it may not be necessary to read these so often as the mementos themselves, they will be printed in a smaller type, that they may be perused or passed by at the will of the reader.

MEMENTO I.

The instruments that are to be employed in the operation, particularly the knife that is to divide the cornea, should be carefully examined.

The instruments should be perfectly free from rust or stain. The point of the cornea knife should be tried on a thin skin, to ascertain that it is sharp

sharp and firm. Its edge should be keen; and its back blunt. Its shape should be that of a wedge; and its width in the broadest part five-eighths of an inch.

II.

The patient should be prepared by taking a purgative medicine on the day previous to the operation, and by losing a few ounces of blood on the day it is performed; unless general debility, or some other powerful reason, render these precautions unnecessary.

Be not deceived by suspicious symptoms of weakness, and do not consider age and weakness to be necessarily connected together.

III.

A good light should be chosen, and the head and eye of the patient be placed in a position that may give the operator a distinct view both of the cornea and pupil.

The patient should be seated opposite to a clear steady light. The eye on which the operation is to be performed should be opposed obliquely to the window, in such a way that the luminous point, reflected by the cornea, may be on its outer side, next to the temple; and may not confuse the view of that part

part of this tunic, where the point of the knife is to emerge, on its inner side, next the nose.

IV.

The patient should be seated on a chair that is lower than that of the operator.

This is necessary in order to enable the operator to apply the requisite instruments to the eye of the patient with ease to himself. And it is more desirable, that the patient should sit on a low chair than that the operator should sit on a high one; because in the latter case, unless the operator be very tall, his feet will not be able to touch the ground; and this is necessary in order to give him a firm seat during the operation. If, again, the patient be not seated on a low chair, the assistant who supports the upper eyelid will require the aid of a book or stool upon which to stand, in order to enable him to carry his hand easily over the patient's head.

V.

A slight check should be put on the patient's arms.

Although it be not necessary to confine the hands of the patient during the operation, it is advisable that a friend sit on each side of him, and place a hand gently on each arm, in order to prevent him from

from unintentionally raising his hand to his head, when the operation begins; but in doing this the assistant should take particular care that his hands do not touch the knees of the operator.

VI.

The assistant who is to support the upper eyelid should stand behind the patient, inclining to the side opposite to that of the eye upon which the operation is to be performed.

The patient's head should rest against the breast of the assistant who is to support the upper eyelid; and the assistant should be sufficiently tall to be able to carry his fingers, with ease, over the head, and to see them accurately applied upon the lid. To do this effectually, he will find it more convenient to stand on the side opposite to that of the eye on which the operation is to be performed, than either on the same side, or directly behind the patient.

VII.

If the operation is to be performed only on one eye, and the other eye retain any degree of sight, this eye should be covered with a compress and bandage, before the operation is begun.

This

This advice is necessary to be observed, in order to prevent the patient from being alarmed by the sight of the instruments that are to be employed; since it might incline him to move his head when hey come near the eye.

VIII.

The necessary instructions should be given to the assistant, before the operation is begun.

The assistant should be directed before the surgeon begins the operation, to support the upper eyelid, by gently compressing it against the edge of the orbit, without touching the ball of the eye;—and he should be particularly instructed to quit his hold of the eyelid, without relinquishing the support he gives to the head, as soon as he receives the operator's directions for this purpose.

IX.

In making the puncture of the cornea, the cornea knife should be pushed through, from the side of this tunic next the temple, to that which is next the nose, parallel to the iris, and as nearly to it as it is possible to be carried, without touching it.

If

If this rule be not regarded, there will be great danger either of wounding the iris, or of making the incision through the cornea too small; and the consequence of either of these accidents will be that an inflammation will be excited, which will be liable to injure, and perhaps to destroy the sight that is restored by the operation.

X.

A distinct idea of the difference between the puncture and incision of the cornea should be preserved in the mind; and the latter should not be commenced until the former be compleated.

The least want of steadiness in carrying the knife through the cornea will occasion the aqueous humour to be discharged, and the iris to fall under the edge of the instrument; and if, to avoid this accident, the point of the knife be brought out too soon, the aperture in the cornea will be made too small to allow the easy extraction of the cataract.

XI.

If the point of the knife do not readily come through, on the inner side of the cornea, the

operator should assist it by the application of the edge of the nail either of the fore or middle finger that keeps down the lower lid.

If the point of the knife be not perfectly firm, it will sometimes bend, or pass between the laminæ of the cornea, instead of piercing this tunic on the inner side next the nose. In such a case, if the advice here given be not observed, the operator will be obliged to retract the instrument, and either postpone the operation, or compleat the incision with the blunt pointed knife.

XII.

If the iris be entangled under the edge of the knife, it should be gently pressed down with the point of the finger, at the same time that the instrument is carried forward to compleat the incision.

The reason for this advice is fully detailed, in page 291, of the preceding enquiry.

XIII.

Before the incision of the cornea is quite compleated, the assistant should be directed to withdraw

withdraw his fingers entirely both from the eye and eyelid.

The reason for this advice is also fully given, in page 300, of the preceding enquiry.

XIV.

If the point of the cornea knife come through too soon on the inner side of the cornea, next the nose, it should be withdrawn; and, either the operation be postponed, or the incision compleated with a blunt pointed knife.

The meaning of this advice is, that if the point of the knife, after being carried through the anterior chamber of the aqueous humour, do not pass within a short distance of the inner rim of the cornea, and if, in consequence of the discharge of the aqueous humour, it be not possible to carry it further without puncturing or wounding the iris, it is much more advisable to withdraw the instrument, and postpone the operation, or to finish the incision with the blunt pointed knife, than to continue the incision in this improper direction; since the violence, which is likely to be done to the iris, as the cataract comes through so small an aperture in the cornea, will endanger a contraction of the pupil, and, of course, a successful issue of the operation.

XV. The

XV.

The incision of the cornea is not required to be so large in children and young persons, as it is in those who are further advanced in life.

In young persons the cataract is in general either fluid or soft, and therefore it will come through a small incision in the cornea, without doing injury to the iris; and though the capsule of the crystalline be also opaque, which in such cases is not unusual, it may be extracted through this small aperture, by means of a forceps, with even less risque of discharging the vitreous humour, than if the incision were larger.

XVI.

The blunt pointed cornea knife should be used with great care, to avoid wounding the iris.

This blunt pointed knife should be narrower than the common sharp pointed knife, in order that it may pass without difficulty through the aperture that has been previously made with the knife that is used to puncture the cornea. It should be gently pushed through the anterior chamber to the inner side of the cornea, taking care during its progress

gress to avoid all kind of pressure on the eye, (not only by the operator, but also by his assistant,) in order to hinder the iris from coming under its edge. When the blunt end of the instrument has reached the inner side, a puncture should be made upon it with the point of a lancet, in order to make a way for it to come through. If this process be required on the right eye of a patient, the cornea knife being held, of course, in the left hand of the operator, his right hand will be at liberty, and he may make the puncture with it without any difficulty;—but if it be required on the left eye, as the cornea knife must be held in the right hand of the operator, if he be not a perfect master of the left hand, the puncture on the blunt end of the instrument will be best made either by the assistant, who supports the upper lid, or by some other steady person who is near; and when the blunt end of the knife is brought through, the incision is to be finished exactly in the same way as if the sharp pointed knife only had been employed.

XVII.

If the incision through the cornea do not pass sufficiently low, it may be enlarged upward with a pair of blunt pointed scissars.

After the punctuation of the cornea has been completed, whether it be made with the sharp or the blunt pointed instrument, care should be taken, in completing

pleating the incision, to carry the knife down to the lower rim of the circumference of the cornea. If this direction be not properly regarded, or if the knife, at first, be not introduced sufficiently high, the aperture will be found too small for the cataract to pass easily through it; in which case, it should be enlarged with a pair of blunt pointed scissars; and it will be found, in general, that the scissars may be introduced more easily on the outer side, where the knife enters the cornea, than on the inner side, where it emerges from this tunic.

XVIII.

When the incision through the cornea has been compleated, in all the subsequent parts of the operation, the operator should take on himself the whole charge of supporting the upper eye-lid.

There is so much danger from the application of an undue degree of pressure on the eye, that I would advise the operator to take the whole charge both of the eye and the eye-lid on himself, as soon as the help of an assistant can be dispensed with; and this help is very rarely required after the incision through the cornea has been compleated. In all the subsequent parts of the operation, the operator may with great ease support the upper eye-lid with the fingers of his left hand, either by gently compressing

it

it against the edge of the orbit, or by embracing the skin that covers it between his thumb and fingers. He may thus raise it sufficiently high to give him a view of the pupil, whilst at the same time, his right hand will be at liberty to hold the curette or any other instrument that may be required in compleating the operation.

XIX.

In those cases where the capsule of the crystalline humour is unusually tough, or adherent to the crystalline, it may be necessary to introduce a hook through the pupil, and to pass it behind the cataract, in order to expedite its extraction.

Notwithstanding the capsule of the crystalline is, in general, so soft that it may be punctured with great ease with the sharp end of the curette, and this puncture may be enlarged, by moving the curette upward and downward, to a size sufficient to allow the crystalline to come through without difficulty, yet in some instances it is so very tough, that the puncture of it can neither be accomplished by the curette, nor even by the sharp pointed curved knife, which is occasionally employed for this purpose. In such a case, the usual pressure, both above and below the cornea, is alike insufficient to bring the

the cataract through; and if it be increased, a part of the vitreous humour will unavoidably be discharged, and afterwards the cataract will retreat from the pupil and sink in the eye on every subsequent attempt to extract it. When such an accident occurs, it becomes necessary to deviate from the advice that was given in the last memento; and after ascertaining that the incision of the cornea is sufficiently large, the care of the upper eye-lid must be committed to a steady assistant. The operator is then to place one or two fingers of his left hand, with a moderate degree of pressure, upon the eye, a little below the cornea; and the cataract being thus in some degree prevented from sinking lower in the vitreous humour, a small hook is to be introduced through the pupil, and carried behind the crystalline, in such a way, that its point may be entangled in the posterior part of its capsule; when being pushed gently forward, the crystalline and its capsule are to be extracted together. In doing this the operator should be particularly careful that the fingers, both of himself and his assistant, be removed from the eye the moment the cataract is extracted, in order, as far as is possible, to hinder an effusion of the vitreous humour.

XX.

If by any accident, a portion of the vitreous humour be discharged, the eye-lids are immediately

diately to be shut, and the eye to be left at rest for a few minutes, before the surgeon proceeds to finish the operation.

This is necessary in order that the eye may recover from the spasmodic action, which always takes place when an aperture is made in the capsule of the vitreous humour. After a few minutes, however, the eye may be examined, with very little risk of a further effusion. The iris may then be adjusted, so as to make the pupil round, and the usual means be employed to make the flap of the cornea lie smooth and even.

XXI

In removing opaque portions of the crystalline humour, great care should be taken that the posterior portion of the capsule of the crystalline be not punctured by the end of the curette.

The reasons for this caution are fully explained in page 301.

XXII.

After the cataract is extracted, the flap of the cornea should be accurately adjusted.

The bandage should not be applied until the operator is satisfied that the iris has perfectly resumed its proper position, and the flap of the cornea is so accurately applied, that no room is left for a subsequent discharge of the aqueous humour. If any difficulty be experienced in thus adjusting the flap of the cornea, the operator should wait a few minutes, and then examine the eye a second time, when it may most probably be done with greater ease than on the former attempt.

XXIII.

Loose eyelashes should be removed; those which are inverted should be either replaced in their natural position, or be extracted; and particular care should be taken to hinder the edge of the lower eye-lid from raising or rumpling the flap of the cornea.

I have insisted much on the importance of this advice in the preceding enquiry, page 323; and I shall only add here that a violent contractile action of the muscles of the face is liable to occasion a dangerous inversion of the lower eye-lid, after the operation has been compleated in the best manner that is possible, and notwithstanding the greatest care has been taken during its performance to prevent such an accident. A few years ago, a serious disappointment

disappointment had very nearly occurred, from this cause, to an old lady, on whom I had performed the operation in the most satisfactory manner, and who had afterwards seen with remarkable clearness every object I placed before her. When the bandage was applied, I congratulated her on the happy termination of the business; upon which she squeezed my hand so forcibly, and accompanied it with so violent a contraction of the muscles of the face, that I instantly suspected it might be accompanied with a dangerous elevation of the lower eye-lid. Under this impression, I removed all the dressings; and on opening the lids, I found, agreeably to my suspicion, that the flap of the cornea had been raised and rumpled by the action of the lower lid. It was easily readjusted, and no injury was done to the eye; but if the cornea had been left in its rumpled state, it must be evident, that it would have excited so great an inflammation as infallibly to destroy the sight. The danger arising from such an accident strongly enforces the necessity of directing the patient to abstain from talking, and from taking a part in the usual concerns of life, as well as from partaking of such solid food as requires mastication, for the first three or four days after the performance of the operation.

XXIV.

In applying the bandage, care should be

taken to prevent it from pressing forcibly or unequally on either of the eyes.

If the bandage be made of several pieces of linen sewed together, the part, where these pieces are united, should not be suffered to lie over the eyes.

The treatment after the operation is particularly described in the preceding tracts, page 212 of Baron Wenzel on the Cataract, and page 335 in the Enquiry.

CASE

OF

A YOUNG GENTLEMAN,

WHO

Recovered his Sight when seven Years of Age,

AFTER HAVING BEEN DEPRIVED OF IT BY

CATARACTS, BEFORE HE WAS A YEAR OLD;

WITH

SOME REMARKS ON THE MODE OF OPERATING IN SUCH CASES.

CASE, &c.

Read before the Royal Society, June 11, 1801.

MASTER W. the son of a respectable clergyman at Castlecary, in Somersetshire, was born in the year 1793; and, for many months, appeared to be a healthy perfect child: his eyes, in particular, were large and rather prominent. When about six months old, he began to cut his teeth; which was attended with great pain, and frequently with violent convulsive fits. About the end of his first year, a number of persons passing in procession near his father's house, accompanied with music and flags, the child was taken to see them; but, instead of looking at the procession, it was observed that, though he was evidently much pleased with the music, his eyes were never directed to the place from whence the sound came. His mother, alarmed by this discovery,

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was naturally led to try whether he could see silver spoons, and other glaring objects, which she held before him at different distances; and she was soon convinced, that he was unable to perceive any of them. A surgeon in the country was consulted, who, on examining the child's eyes, discovered an opacity in the pupils, which was so considerable, that he did not hesitate to pronounce there was a complete cataract in each. A description of the child's situation was then sent to me, with a request that I would point out those steps which its parents should pursue. The case was so evident, that I could not hesitate in saying, that the removal of the opaque crystalline humour, from the place it occupied behind the pupil, was the only method by which the child could obtain his sight; and, attached as I was, at that time, in all cases, to the operation of extracting the cataract, in preference to that of depressing it, I added, that I did not think he would be fit for the operation, until he was at least thirteen or fourteen years old. This advice being approved, all thoughts of assisting his sight were, for

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the present, relinquished. He soon discovered a great fondness for music; his memory was very retentive of the little stories that were read or recited to him; and, in every way, it became evident that he had a mind capable of receiving information. As soon as he could speak, it was also observed, that when an object was held close to his eyes, he was able to distinguish its colour, if strongly marked; but on no occasion, did he ever notice its outline or figure. In November, 1809, his parents took him to Bristol; whither they went for the purpose of seeing the works carried on in the School for the Indigent Blind in that city, and in order that they might ascertain whether their son, who was then arrived to his seventh year, could be taught any thing that would be useful or amusing. Here he very quickly learnt the art of making laces. But his parents, having brought him so far from home, thought it advisable to extend their plan, and make a visit to the metropolis, for the sake of giving me an opportunity of inspecting his eyes, and of hearing whether my opinion continued the same as that which I had written

written to them six years before. About a month previous to the time of their arrival, a Portuguese boy, fourteen years old, had been put under my care, who was in a similar situation; and, in this case, notwithstanding all the efforts I could use, I found it impossible to fix the eye, in order to extract the cataract, without employing a degree of force which might have been highly injurious. I therefore relinquished my intention of performing the operation in that way, and determined to make use of the couching needle; being prepared, either to depress the cataract with this instrument, if it were sufficiently solid for the purpose, or, if it were soft or fluid, (which I rather expected), to puncture its capsule largely, so as to bring the opaque crystalline into free contact with the aqueous and vitreous humours. In order to fix the eye for this operation, I was not afraid to make use of a speculum oculi; since a pressure, which would have been highly dangerous in extracting the cataract, might be applied on the present occasion with perfect safety. Conformably to my expectation, the cataract was of a

soft

soft consistence; in consequence of which, I was not able to depress it, and contented myself with making a large aperture through the capsule, by means of which the crystalline was brought into contact with the other humours, a considerable part of it coming forwards, and and shewing itself directly under the cornea.

This being the immediate result of the operation, it could not be expected that any improvement should be made in the sight of the patient at that time. In a few days, however, the opaque matter was wholly absorbed; the pupils became clear; and the lad recovered the sight of both his eyes[1]. Encouraged by the success which followed this operation, I was induced to retract the opinion which I had for-

[1] It should be remarked, that the sight obtained by children who are born with cataracts, is seldom so perfect as that which those recover, after the operation, who are afflicted with the disorder later in life. In consequence either of some remaining opacity in the crystalline capsule, which hinders the free admission of the rays of light, or of a greater tenuity in the remaining humours of the eye, children require, in general, a much deeper convex glass to enable them to see minute objects; and, at the same time, they are obliged to hold them much nearer their eyes than elder persons.

merly

merly sent to Master W.'s father, (which opinion I had given under the impression that the cataract should be extracted,) and I now proposed, that an attempt should be made to afford relief to one eye at least, without further loss of time; this attempt, in the way above mentioned, being practicable with as much safety at his present age as at any future period; and, if it proved successful, it would give the young gentleman the benefit of vision five or six years sooner than his friends had been encouraged to expect, by my former letter on this subject. They were naturally much pleased with this alteration in my advice; and the child himself appearing to possess a great degree of fortitude, I performed the operation on the left eye, on the 29th of December last, in the presence of Mr. Chamberlayne, F. A. S. Doctor Bradley, of Baliol College, Oxford, and Mr. Platt, surgeon, in London. It is not necessary, in this place, to enter into a description of the operation. It will be sufficient to say, that the child, during its performance, neither uttered an exclamation, nor made the smallest motion either

either with his head or hands. The eye was immediately bound up, and no inquiries made on that day with regard to his sight. On the 30th, I found that he had experienced a slight sickness on the preceding evening, but had made no complaint of pain, either in his head or eye. On the 31st, as soon as I entered his chamber, the mother with much joy, informed me that her child could see. About an hour before my visit, he was standing near the fire, with a handkerchief tied loosely over his eyes, when he told her that under the handkerchief, which had slipped upward, he could distinguish the table by the side of which she was sitting: it was about a yard and a half from him; and he observed that it was covered with a green cloth, (which was really the case,) and that it was a little farther off than he was able to reach. No further questions were asked him at that time; as his mother was much alarmed, lest the use thus made of his eye might have been premature and injurious. Upon examination, I found that it was not more inflamed than the other eye; and the opacity in the pupil did not

appear

appear to be much diminished. Desirous, however, to ascertain whether he was able to distinguish objects, I held a letter before him, at the distance of about twelve inches, when he told me, after a short hesitation, that it was a piece of paper; that it was square, which he knew by its corners; and that it was longer in one direction than it was in the other. On being desired to point to the corners, he did it with great precision, and readily carried his finger in the line of its longest diameter. I then shewed him a small oblong bandbox covered with red leather, which he said was red and square, and pointed at once to its four corners. After this, I placed before him an oval silver box, which he said had a shining appearance; and, presently afterwards, that it was round, because it had not corners. The observation, however, which appeared to me most remarkable, was that which related to a white stone mug; which he first called a white basin, but soon after, recollecting himself, said it was a mug, because it had a handle. These experiments did not give him any pain; and they

were

were made in the presence of his mother, and of Mr. Woodford, a clerk in his Majesty's Treasury. I held the objects at different distances from his eye, and inquired very particularly if he was sensible of any difference in their situation; which he always said he was, informing me, on every change, whether they were brought nearer to, or carried further from him. I again inquired, both of his mother and himself, whether he had ever, before this time, distinguished by sight any sort of object; and I was assured by both that he never had, on any occasion; and that, when he wished to discover colours, which he could only do when they were very strong, he had always been obliged to hold the coloured object close to his eye, and a little on one side, to avoid the projection of the nose. No further experiments were made on that day. On the 1st of January, I found that his eye continued quite free both from pain and inflammation, and that he felt no uneasiness on the approach of light. I shewed him a table knife; which at first he called a spoon, but soon rectified the mistake, giving it the right

name, and distinguishing the blade from the handle, by pointing to each as he was desired. He afterwards called a yellow pocket-book by its name, taking notice of the silver lock in the cover. I held my hand before him; which he knew, but could not at first tell the number of my fingers, nor distinguish one of them from another. I then held up his own hand, and desired him to remark the difference between his thumb and fingers; after which he readily pointed out the distinctions in mine also. Dark-coloured and smooth objects, were more agreeable to him than those which were bright and rough. On the 3d of January, he saw, from the drawing-room window, a dancing bear in the street; and distinguished a number of boys that were standing round him, noticing particularly a bundle of clothes which one of them had on his head. On the same evening, I placed him before a looking-glass, and held up his hand: after a little time he smiled and said he saw the shadow of his hand, as well as that of his head. He could not then distinguish his features; but, on the following day, his mother having again placed

him

him before the glass, he pointed to his eyes, nose, and mouth, and seemed much gratified with the sight.

Having thus stated the principal observations that were made by Master W. I shall now make a brief comparison between this statement, and that which is given in the xxxvth volume of the Philosophical Transactions, of Mr. Cheselden's patient, who was supposed to be born blind, and obtained his sight when he was between thirteen and fourteen years old.

It should be observed, that though Master W. was six years younger than Mr. Cheselden's patient, he was remarkably intelligent, and gave the most direct and satisfactory answers to every question that was put to him. Both of them, also, if not born blind, lost their sight so very early, that, as Mr. Cheselden expresses it, "they had not any recollection of "having ever seen."

My first remark is, that, contrary to the experience of Mr. Cheselden's patient, who is stated "to have been so far from making any

" judgment of distance, that he thought all " objects touched his eyes, as what he felt did " his skin," Master W. distinguished, as soon as he was able to see, a table, a yard and a half from him; and proved that he had some accuracy in his idea of distance, by saying, that it was a little further off than his hand could reach. This observation, so contrary to the account we have received of Mr. Cheselden's patient, would have surprised me much more than it did, if I had not previously, in some similar instances, had reason to suspect that children, from whom cataracts had been extracted, had a notion of distance the first moment they were enabled to see. In the instance particularly of a young gentleman from Ireland, fourteen years old, from each of whose eyes I extracted a cataract, in the year 1794, in the presence of Dr. Hamilton, physician to the London Hospital, and who, before the operation, assured me, as did his friends, that he never had seen the figure of any object, Dr. Hamilton and myself were much astonished by the facility with which, on the first experiment,

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he took hold of my hand at different distances, mentioning whether it was brought nearer to or carried further from him, and conveying his hand to mine in a circular direction, that we might be the better satisfied of the accuracy with which he did it. In this case, however, and in others of a like nature, although the patients had certainly been blind from early infancy, I could not satisfy myself that they had not, before this period, enjoyed a sufficient degree of sight to impress the image of visible objects on their minds, and to give them ideas which could not afterwards be entirely obliterated. In the instance of Master W. however, no suspicion of this kind could occur; since, in addition to the declaration of himself and mother, it was proved by the testimony of the surgeon who examined his eyes in the country, that the cataracts were fully formed before he was a year old. And I beg leave to add further, that on making inquiries of two children, between seven and eight years of age, now under my care, both of whom have been blind from birth, and on whom no operation has yet been

performed, I find that the knowledge they have of colours, limited as it is, is sufficient to enable them to tell whether coloured objects be brought nearer to them, or carried further off; for instance, whether they are at the distance of two inches or four inches from their eyes; nor have either of them the slightest suspicion, as is related of Mr. Cheselden's patient, that coloured objects, when held before them, touch their eyes.

But the judgment which Master W. formed of the different distances of objects, was not the only instance in which he differed from Mr. Cheselden's patient; who, we are informed, "did not know the figure of any thing, nor "any one thing from another, however differ-"ent in shape and magnitude;" for Master W. knew and described a letter, not only as white, but also as square, because it had corners; and an oval silver box, not only as shining, but also as round, because it had not corners: he likewise knew, and called by its name, a white stone mug, on the first day he obtained his sight, distinguishing it from a basin, because

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it had a handle. These experiments were made in the presence of two respectable persons, as well as myself; and they were several times repeated, to convince us that we could not be mistaken in them. I mention the circumstance, however, with much diffidence, being aware that the observations not only differ from those that are related of Mr. Cheselden's patient, but appear, on the first statement, to oppose a principle in optics, which I believe is commonly and justly admitted, that the senses of sight and feeling have no other connection than that which is formed by experience; and, therefore, that the ideas derived from feeling can have no power to direct the judgment, with respect either to the distance or form of visible objects. It should be recollected, however, that persons who have cataracts in their eyes, are not, in strictness of speech, blind, though they are deprived of all useful sight. The instances I have adduced prove, that the knowledge they have of colours is sufficient to give them some idea of distance, even in their darkest state. When, therefore,

therefore, their sight is cleared by the removal of the opaque crystalline, which intercepted the light, and the colour of objects is thereby made to appear stronger, will it be difficult or unphilosophical, to conceive that their ideas of distance will be strengthened, and so far extended as to give them a knowledge, even of the outline and figure of those objects with the colour of which they were previously acquainted?

The case which I have here related appears to deserve notice, not only on account of the observations that were made by the patient on recovering his sight, but also on account of the hint which it affords to surgeons, relative both to the mode in which the cataract may best be removed, when children are born with this disorder, and the time when it is most proper to perform the operation.

The Baron de Wenzel, in his ingenious Treatise on the Cataract, with great force of reasoning, deduced from the long and successful experience of his father and himself, recommends, in all cases of this disorder, without making

making any exceptions, the operation of extraction, in preference to that of depression; and I believe it is now generally acknowledged by medical men, that, in the more common cases, his decision, as to the mode of operating, is perfectly well founded. The Baron admits that the operation is not so certain a cure in children as it is in persons of a more advanced age; both on account of their untractableness, and because, in them, the opacity of the crystalline is not unfrequently accompanied with an opacity in the capsule that contains it. On these accounts, when children are born with this disorder, he advises to postpone the operation until they are old enough to be made sensible of the loss they sustain by the want of sight, and have firmness of mind to submit patiently to the means that are requisite in order to obtain it. Influenced by this opinion of the Baron, and believing the operation of extraction to be so much superior to that of depression, that the latter ought not, on any occasion, to have the preference, I have given advice, in the

the cases of a considerable number of children who were born with this disorder, to postpone every attempt to relieve them, until they were thirteen or fourteen years old. Prior to this time, it did not appear to me that children could be depended upon to submit, with due steadiness, to the repeated introduction of instruments, which is sometimes necessary in extracting the cataract; and, even at this age, the eyes of some are so small, and in such a constant rolling motion, that it is almost impossible properly to accomplish the operation. The Portuguese lad, whose case has been related, afforded an instance of this kind; and I consider it as a fortunate circumstance that it came under my notice, since, in some degree, it may be said to have obliged me to examine, more attentively than I had before done, the advantages and disadvantages of the operation of depression; which operation, being more easy to perform than that of extraction, has certainly this advantage in the cases of children, (to whom alone I here advert,) that it may be performed

formed with equal safety when they are only seven years of age, as it may at any subsequent period of their lives.

It is well known that the late Mr. Pott, who published his remarks on the cataract in the year 1775, was a strenuous advocate for the operation of depression; and, though he appears to me to have much under-rated the advantages of extraction, it must be allowed that he makes many just and highly pertinent observations on the use of the couching needle, in those cases where the cataract is soft, or fluid. Mr. Pott considered this as a very common state of the disorder; and does not make any distinction between the cataract, when it attacks grown persons, and when children are born with it. In the former case, experience inclines me to believe, that the cataract is very rarely fluid, or even soft; whereas, in the latter, I have always found it, agreeable to the observation of the Baron de Wenzel, in one or other of these states. Although, therefore, in the case of grown persons, the operation of extraction

tion appears to me to have very great advantages over that of depression, yet, in the case of children, I can readily accede to almost the whole that Mr. Pott advances in favour of depression. If the couching needle be passed in the way in which it is usually introduced to depress the cataract, and thereby a large aperture be made in the capsule of the crystalline, (which operation may be performed with perfect safety, and with very little pain to the patient, whilst the eye is fixed with a speculum oculi,) the opaque crystalline, being thus brought into contact with the aqueous and vitreous humours, will, in a shorter or longer space of time, according to its degree of softness, be absorbed; and, if there be not an opacity in the capsule, as well as in the crystalline, the pupil will become clear, and the patient will acquire a very useful sight. If, in addition to the opacity of the crystalline, the capsule be also opaque, and, in consequence of this, the operation do not prove successful, the eye will nevertheless be perfectly uninjured, and it will be as fit, at a subsequent period, to have

have the capsule extracted, as it would have been if no attempt of the above kind had been previously made.

From the foregoing observations, I flatter myself I shall be justified in deducing the following inferences.

First, When children are born blind, in consequence of having cataracts in their eyes, they are never so totally deprived of sight as not to be able to distinguish colours; and, though they cannot see the figure of an object, nor even its colour, unless it be placed within a very short distance, they nevertheless can tell whether, when within this distance, it be brought nearer to, or carried farther from them.

Secondly, In consequence of this power, whilst in a state of comparative blindness, children who have their cataracts removed, are enabled, immediately on the acquisition of sight, to form some judgment of the distance, and even of the outline, of those strongly defined objects with the colour of which they were previously acquainted.

Thirdly,

Thirdly, When children have been born with cataracts, the crystalline humour has generally, if not always, been found either in a soft or fluid state. If, therefore, it be not accompanied with an opacity, either in the anterior or posterior portion of the capsule, and this capsule be largely punctured with the couching needle, introduced in the way in which this instrument is usually employed to depress the cataract, there is reason to expect that the opaque matter will, sooner or later, be absorbed, the pupil become clear, and the sight be restored.

Fourthly, If, in addition to the opacity of the crystalline humour, its capsule be also opaque, either in its anterior, or posterior portion, or in both, (which circumstance cannot be ascertained before the operation,) and, in consequence of this, the operation above mentioned should not prove successful, it will not preclude the performance of extraction afterwards, if this be thought advisable.

Fifthly, The operation above mentioned being

being much more easy to perform than that of extraction, and it being possible to fix the eye with perfect safety during its performance, by means of a speculum oculi, it may be undertaken at a much earlier age than the latter operation; and a chance may of course be given to the patient of receiving instruction, without that loss of time which has usually been thought unavoidable, when children are born with this disorder [2].

[2] It ought to be mentioned, that about a month after the above-mentioned operation on Master W.'s left eye, I performed a similar operation on the right eye of the same young gentleman. Although he behaved with great firmness on the first occasion, it was not without considerable difficulty that his head was kept steady on the second. The operation, however, gave him very little pain, and no inflammation followed; but the opacity afterwards was not diminished; and he did not acquire any additional sight from this eye. There was an evident mark in that part of the capsule where the couching needle pierced it; though the aperture was too small to admit a sufficient number of rays of light to give an idea of objects. It seems probable that the want of success, in this instance, was owing to an opacity in the capsule, which was incapable of being absorbed. The eye, however, is as fit to have the aperture in the capsule enlarged, or a portion of it removed, when the patient is of a proper age, as if no operation had been previously performed.

I beg

I beg leave also to add, that since these pages were put together, a case has come under my care, which seems to afford a confirmation of the remarks that have been offered respecting the state of the cataract in children, and the effects that are likely to be produced by the operation of puncturing the capsule that contains it. A young lady, eighteen years old, was put under my care, who had been blind from an early part of her infancy. She had a cataract completely formed in both eyes; and in each there were three or four opaque spots, more white than the rest, which seemed to lie on the surface of the opaque crystalline. I punctured the capsule of each with a couching needle, according to the proposition in the preceding pages, in the presence of Mr. Scott, surgeon, in St. Alban's-street. The operation gave her no pain; and, in the course of a few days, the opacity was evidently diminished, particularly in the right eye, the patient discovering the colour of objects more plainly than before, but being still unable to distinguish their figure. At the end of a month, finding no further improvement in her vision, it appeared to me most probable that the remaining opacity was situated in the capsules. I therefore determined to extract either a part or the whole of each of them. The incisions of the cornea were made in the usual manner; after which, I punctured the anterior parts of both the capsules with the sharp end of a gold curette. The punctures became immediately transparent, without affording an issue to the liquor Meibomii, or any other humour. From hence it seems evident, that nothing was contained within the capsules, or, in other words, that the crystalline humours were absorbed; and it appears to me highly probable, that their absorption had been occasioned by the previous operation of puncturing their capsules with the couching needle. I dilated the new punctures with the end of the curette; and afterwards, being still afraid that the

the apertures in the capsules might not be large enough to admit a sufficient number of the rays of light, I removed a a portion of each of them with a small forceps. This was accomplished in the left eye, without occasioning the discharge of any part of the vitreous humour; and, in the right, the quantity of this humour that came away was very small. In the course of a week, the inflammation that followed the operation was nearly removed; a large portion of both pupils was quite clear; and the young lady distinguished objects with quickness and precision.

ON

THE DISSIPATION

OF

THE CATARACT.

AN INSTANCE

OF

RECOVERY OF SIGHT,

BY THE

DISSIPATION OF A CATARACT,

WHICH HAD OCCASIONED

BLINDNESS IN ONE EYE FOR *ELEVEN* YEARS:

WITH A HINT GROUNDED ON IT,

Respecting the Mode of Cure in similar Complaints[3].

MR. L. a merchant at Quebec, in October 1776, when about twenty-nine years of age, received a blow on his left eye by a splinter of a rusty chissel, which started from it as he was striking it with a hammer. The only bad effect, which he at first felt from the accident, was a momentary pain in the eye, and which, though acute for the present, went off without the aid of any medical application whatsoever.

[3] This paper on the dissipation of the cataract was read before the Medical Society of London, October 27, 1789; and the Supplement that is annexed to it on the 7th of June, 1790. The Notes were added afterwards.

soever. As the patient had then the same use of this eye as before, for all the common purposes of life, and was even able to read with it, he had not, at this time, the smallest apprehension of experiencing any material injury from what had happened. It was not, however, long, before he became sensible of some degree of obscurity in the sight of it; and from that time the dimness gradually increased, till, in less than six months after, he found himself deprived of all further assistance from this eye, than to be capable of distinguishing the strong light of the day from the darkness of night. In the progress of the disorder, the eye was examined by two gentlemen of the faculty at Quebec, Dr. M'Namara Hayes, and Dr. Kennedy, neither of whom, at first, could perceive any opacity in the crystalline, though afterwards it became very evident to them both. At the first appearance of the complaint, these gentlemen advised the patient to take small doses of mercurius dulcis, but perceiving no good effects produced by the use of this medicine, it was soon laid aside. In the year 1777 he came to England,

England, and consulted the late Dr. Fothergill, who on examining the eye, entirely concurred in the opinion with the physicians before mentioned—that the the crystalline humour was opaque; but, as the sight of the right eye continued quite perfect, the doctor's advice was not to meddle at all with the other for the present. He returned to Quebec in the year following, and there remained in the same state of blindness, with the left eye, till the year 1787, when he again came to England. On the 7th of April, 1788, whilst on this second visit here, he was attacked with a violent pain in his head, which particularly affected him across his forehead. In the middle of the following night a pain seized him in the disordered eye, which when he rose in the morning, appeared to be considerably inflamed. The other was also inflamed, though in a much less degree. The latter complaint, however, seemed gradually to abate of itself till the 14th, when its violence returned in both eyes. At that time, the pain in the left eye was particularly severe, and extended over the temples and forehead. The following

following treatment was now used. The patient was let blood in the arm; blisters were put behind his ears; a fomentation of chamomile flowers, mixed with laudanum, was applied two hours every day to the eyes; and laudanum draughts were given to procure him rest at night. But these means, however proper in themselves, did not, for the present, meet with the success which might have been expected from them. For, notwithstanding their use, the inflammation and pain continued with violence a week longer. Then it was that the patient, for the first time, perceived the light with the left eye stronger than before; and in a day or two after, to his great surprise; the sight of this eye improved so much as to render him capable of distinguishing with it several large objects that were near him. The inflammation, at that time, though it had in part subsided, was still considerable in both eyes; but, continuing gradually to abate, in three weeks it went off entirely; when, not only the sight of the right eye became as perfect as ever, but that of the other, which had been lost eleven years,

was

was so much farther recovered, that the patient was able to distinguish all large objects; even those which were at some distance, as well as those which were near. The great progress made in the cure of this eye was also very discernible in its appearance. For the crystalline humour, instead of being opaque as it before was, now resumed its natural clearness and transparency; and, in this respect, it was not to be distinguished from that of the eye which had always remained sound. There were yet, however, some remaining defects in the left eye, which made the patient very desirous of taking further advice, to see if any thing more could be done towards restoring the full use of it. Accordingly in the month following I was desired to examine it. I found, notwithstanding the crystalline humour of this eye had recovered its transparency, that the pupil was still larger than its natural size; and though it regularly performed the office of contraction and dilatation according as the light acted upon it, yet the iris had constantly, besides this, a tremulous motion, similar to that which I have

not

not unfrequently observed it to acquire, after the operation of extracting the cataract. In cases of the latter kind it seems to be occasioned by the loss of support which the posterior part of the iris sustains, in consequence of the removal of the crystalline humour; and though in the case I am now describing, no such operation had been performed, yet no other account is I think to be given of this similar motion in the iris, but that it was owing to the weak support it derived from the parts situated behind it. As to the use which the patient had of this eye, I found on inquiry, that though he had some discernment of all large objects, and of not a few a tolerably distinct one, yet he was far from seeing them with the same degree of perfection as with the other eye; and, with the disordered one, he was not yet able to distinguish, to any degree of precision, even large letters in a book. Having attended to every point of information which I had gained, both from the patient's account and my own examination, it appeared to me more than probable that the crystalline humour was completely dissolved;

solved; and this I believed to be the occasion, not only of the tremulous motion in the iris before noticed, but likewise of that defect in the sight, of which the patient still complained. I was clearly of opinion, also, that this defect could be no otherwise remedied, than by the use of a proper glass to act as a substitute for the dissolved humour. In this judgment of the case, I was soon fully confirmed; for, upon desiring the patient to make the experiment with a convex glass of five inches focus, on looking through it, he immediately distinguished distant objects equally well with the affected as with the sound eye. I then made a further experiment, with a convex glass of only two inches and a half focus; on the use of which, he received so much additional assistance, that he could read with ease a common newspaper [3]. Soon after this time he returned to Quebec, the place of his residence; since which I have

[3] I was led to the trial of the convex glasses above described, from their having been found to suit most eyes, after the removal of the crystalline, by either of the usual operations. The glass with the larger focus for more distant objects and the smaller for such as were near.

received no particular information with regard to his sight; but there is good reason to believe, he still retains it, in the same degree of perfection as when he left England.

Having stated the leading particulars of Mr. L.'s case, I beg leave to subjoin the following remark upon it. The immediate cause of the blindness in consequence of the blow on the eye, as above mentioned, was undoubtedly, that of an opacity in the crystalline humour. This is now universally understood to constitute the true cataract. And I persuade myself, most gentlemen of the faculty would have pronounced the sight of an eye, in such a state of blindness, to have been altogether irrecoverable, but by one or other of the usual operations, of couching, or extraction. But in the case I have been describing, no operation was ever performed, or intended. In restoring the use of the eye, which for so many years Mr. L. had totally lost, nature herself seems to have done the chief part of the business by the inflammation, brought on, in consequence, as was supposed, of a cold, which the patient caught. For, by

means of the several remedies, already mentioned in describing the case, and which are commonly made use of under similar inflammatory complaints, aided by the state of action, into which the eye was thrown by the inflammation itself, not only this inflammation was subdued, but the opacity of the crystalline humour was gradually dissipated, till, with the restoration of transparency in appearance, the sight of the eye was also recovered. This remarkable change which took place in Mr. L.'s eye, and the great utility of the inflammation, toward promoting so desirable an event, suggested the thought of an inquiry, first into the safety and expediency of employing art, to raise an inflammation, as the first step to a cure in similar cases of blindness; and secondly supposing it a safe measure, respecting the means which would be best adapted for this end. These were the two points, which I had all along in view, by the recital of the case; and to these I would principally direct the attention of the several members of this society. Could the experiment be tried without occasioning further danger

danger to the patient, it might lead to the establishment of a mode of cure, which, whilst it was equally efficacious, would undoubtedly appear less formidable, than the operation now commonly advised under complaints of this nature.

A SUP-

A SUPPLEMENT

TO THE PRECEDING PAPER.

SINCE the preceding paper was read before the Medical Society, I have seen two other cases of Cataracts, similar to that above described, in both of which the opacity was dissipated, and the patients recovered their sight, without submitting to any chirurgical operation.

One of these was that of a woman, fifty-nine years of age, the sight of whose left eye had gradually decreased for ten years; and, during the last twelve months, a cataract had been completely formed, so that she had been unable to distinguish, with this eye, any thing more than the difference between day and night. Notwithstanding this great degree of blindness, and the strong probability of her recovering sight by having the cataract extracted, I always thought it my duty to discourage her from submitting to the operation; because, though the crystalline of the right eye was also manifestly

manifestly affected, yet it still retained sufficient transparency to admit of an useful sight. In February last this woman was struck by a splinter of wood on the upper lid of the left eye, with such force, that it nearly pierced through it, and occasioned a considerable hemorrhage. The eye was almost instantly made sensible of an uncommon and unpleasant bright light; and, the following day, when I examined it, the pupil was become quite clear. It regularly dilated and contracted, according to the degree of light to which the eye was exposed, and the iris had, likewise, the same sort of tremulous motion, which I have described in the preceding case. The patient had suffered no pain since the accident, and the tunica conjunctiva was scarcely at all inflamed. I desired her to look through the convex glasses, that are commonly found useful, after the removal of the crystalline humour; and by the assistance of these, she distinguished both near and distant objects as well as before the sight was at all affected [4].

The

[4] The woman whose case is above related, preserved her sight

The other case was that of a lady, seventy-six years of age, whose right eye, in consequence of

sight about a year; but, at length, without any known cause to occasion it, a solid body suddenly came into the anterior chamber of the aqueous humour, which confused her sight, and afterwards, without giving any considerable pain, frequently deprived her of it. On examining the eye, I was instantly convinced that this solid body was the opaque crystalline humour; which, though invisible when I last saw the patient, was not then dissipated, but, by the violence of the blow above described, was forced out of its capsule, and had fallen to the bottom of the vitreous humour; from whence, by some unperceived motion of the head, it was now risen, and had come through the pupil into the anterior chamber. As soon as I saw the case, I advised the patient to allow me to divide the cornea, that the opaque humour might be extracted; but the pain in the eye being at this time inconsiderable, and the sight of the other eye tolerably good, she put off the operation from one time to another, until at length, the opaque crystalline, which was one of the largest I have ever seen, returned again through the pupil into the posterior chamber, and pushed the iris forward, so as nearly to bring it into contact with the cornea, and to change the figure of the pupil from a round to a transversely oval aperture. Before I had an opportunity to see this change, the crystalline had formed a close union with the edge of the iris, and the light was unable to make the least impression on the retina. The state of the eye was now so greatly changed from that in which it was when I last saw it, and the chance of restoring sight by an operation

of an opacity in the crystalline humour, had been incapable of distinguishing objects more than six years; and the left eye, from the same cause, more than three. In July 1789 I extracted a cataract of a very firm consistence from her left eye, in the usual manner without any particular difficulty; immediately after which, she perceived a number of objects placed before her. I intended, at the same time, to have performed a similar operation on the right eye, but the patient's extreme agitation rendered this improper. The usual compresses and

tion was become so very inconsiderable, that I declined the attempt; and recommended the patient to rest satisfied with the sight she enjoyed from the other eye.

The unhappy issue of the present case affords room for the following caution; viz. on no account to delay the operation of extracting an opaque crystalline, whenever it is forced, as in the instance before us, out of its capsule, and lies loose in the anterior chamber of the aqueous humour; since, in this situation, it is not only liable to keep up a dangerous inflammation, by its constant pressure on the iris, but, if it get back into the posterior chamber, it is apt to form such adhesions, as will render its removal afterwards almost impracticable. In confirmation of this advice see a note annexed to the translation of Wenzel's Treatise on the Cataract, page 34.

bandage

bandage were therefore now applied, and she was removed to her bed. No accident afterwards occurred, during her confinement, that merits a recital; and at the end of ten days, on taking off the applications, and opening the lids, the patient, to my great surprise, not only perceived all objects before her, with the left eye, from which the cataract had been removed, but also with the right eye, upon which no operation of any kind had yet been performed. She now informed me, that almost immediately after my first examination of her eyes, three days previous to the operation on the left, the right eye became sensible of a very great difference in the strength of the light; and, though I had not then done any thing more to it, than to open and shut the lids, a few times in quick succession, in order thereby to learn the state of the pupil, yet the alteration in the sight of the eye, even the same day, was so great, that she could scarcely persuade herself, I had not performed an operation upon it. After the operation on the left eye, both eyes gradually gained strength; they equally received benefit

from the use of convex glasses; and the only difference which the patient perceived, between the sight of the right eye, and that of the left, was this, that objects, viewed with the right, appeared tinged with a yellow colour; whereas, when looked at with the left, they preserved their usual appearance. This difference in the sight did not go off; and at the end of some months, on examining the right eye, I found that, notwithstanding the upper part of the pupil appeared perfectly clear, the lower part, comprehending nearly half of this aperture, was still obscured, by a considerable opacity; the situation of which, whether it was in the crystalline, or in its capsule, I am not at present able to determine[4].

[4] Since the two preceding papers, on the dissipation of the cataract, were read before the Medical Society, I have had occasion to attend a considerable number of cases in which an opacity of the crystalline humour was produced by violence done to the eye; and in most of these the opacity was dissipated, and the sight restored, during the external application of æther. Of the cases that proved successful under this mode of treatment, I have a written account of eight; and a recollection of several others, the particulars of which I have now forgotten, having unfortunately

nately omitted to put them on paper at the time the cases were under my care. It was at first my design to publish on this occasion a full copy of the notes I made on the eight above mentioned; but I find, in the description of them, so great a similitude, not only to one another, but to the case of Mr. L. above related, that the perusal of them would be of little use, and perhaps irksome, to the reader. Sometimes I have diluted the æther with a third or fourth part of a weak solution of hydrargyrus muriatus; but in general I have used the æther alone, which has been applied, by means of a camel's hair pencil, to the eye itself. The application of this remedy occasions a very pungent pain in the eye, with considerable redness in the tunica conjunctiva; but these go off in a few minutes, and leave the eye as easy, and the conjunctiva as pale, as they were before the æther was used. By this excitement of inflammation, and by the increased action it occasions in the different parts of the eye, I presume it is, that the æther promotes the dissipation of the crystalline. In some, the good effects of the application were quickly perceived; but in others, several weeks had elapsed, before any favourable change was discovered. The progress of amendment has been usually slow; and in general it has been first noticed by the patient himself, in consequence of the increased strength with which the light affects the eye. About the the same time a kind of crack in the opaque crystalline is usually perceived on inspection. The number of these cracks gradually increase, until at length the humour assumes an appearance like that of jelly half dissolved. In a few instances the crystalline humour has continued a long time in this semi-dissolved state; but in general the pupil has speedily afterwards become quite clear. Sometimes several opaque spots have remained in the capsule of the crystalline, after the crystalline itself has been wholly dissolved. At other times nearly one half of the pupil has

continued covered by a portion of the opaque capsule, whilst the other half has been perfectly transparent.

It should be recollected that all the cases of cataract, to which I here refer, as having undergone this favourable change, during the application of æther to the eyes, were produced by external violence. Two of the eight, for instance, of which I have a written account, were occasioned by a puncture through the cornea with the pointed end of a fork; a third by a puncture with a steel drill; a fourth by a slight perforation with a piece of thin wire; a fifth by a wound made with a splinter from an iron maul; the cornea of the sixth was cut through, from one side to the other, with a sharp pointed pen-knife; the cornea of the seventh was burst by a blow with a cricket ball; and that of the eighth, by a splinter from a rotten stick.—In one of the two cases, in which the cornea was punctured with a fork, the iris was wounded, and the figure of the pupil was changed to an irregularly oval aperture:—in that, in which a wound through the cornea, was made by the sharp end of a pen-knife, a scar was formed in this tunic, which extended obliquely from one side to the other; but, notwithstanding this, a large portion of the pupil remained open; and ultimately this aperture recovered a considerable degree of transparency both above and below the scar:—in two of the other cases, the capsule of the crystalline remained for a long time partially opaque, after the crystalline humour itself was wholly dissolved,—in the rest, the pupils became quite clear, and preserved their round figure as perfectly as if no accident of any kind had happened.

In a few instances, I have mixed an equal quantity of oil of amber with the æther, instead of applying the latter alone. In one of these, the dissipation of the cataract took place very shortly after the amber was added; but I have not been able, in any of the rest, to ascertain the superior efficacy of this mixture to that of æther alone.

The

The success which attended the treatment of the cases above related affords a hint for improving the operation, in those cases where there is ground to believe that the opaque crystalline is either soft, or fluid; and in this state it usually is when the disorder is discovered in infants, either at the time of their birth, or shortly afterwards.

ON

THE CURE

OF THE

GUTTA SERENA.

A

DESCRIPTION OF TWELVE CASES

OF THE

GUTTA SERENA;

FOUR OF WHICH WERE CURED BY

ELECTRICITY;

FOUR, IN WHICH THE CHIEF MEANS OF CURE WAS

A MERCURIAL SNUFF;

AND FOUR WHICH WERE RELIEVED BY OTHER REMEDIES;

WITH

INCIDENTAL REMARKS ANNEXED TO THE CASES.[1]

CASE I.

A LADY, sixty-three years of age, who had lost the sight of the left eye twenty years, in consequence of a violent ophthalmy, was suddenly attacked, in April 1780, with an appearance like black lace hanging before the right

[1] The first six of the following cases, together with the remarks on their proximate cause, and the mode of their treatment, were read before the Medical Society of London, May 11, 1789.—The seventh and eighth were published in a former edition of this work;—the ninth, tenth, eleventh, and twelfth are now presented to the public for the first time.

eye, and confusing every object at which she looked. It had continued ten days before I saw her. Each day the blackness became deeper and more extensive; and, at that time, every object presented before the eye was altogether invisible. This eye had never been inflamed, and on examining it, I found that the pupil preserved its natural size and colour; and that the power of the iris to dilate and contract this aperture, according to the greater or less degree of light to which the eye was exposed, was not yet wholly lost. The lady had long enjoyed a good state of health, and, the disorder in her sight excepted, was, at the time of consulting me, perfectly well. I immediately applied the electric air by means of a pointed conductor, and continued the application about ten minutes. It was repeated the next day; and on the third, immediately after being electrified, she had a stronger perception of the light. The same application was repeated every day for a fortnight, when she distinguished all large objects before her. I now placed her on the glass-footed stool, and took small

electric sparks from the eyelids and the other integuments surrounding the eye. This experiment, however, was soon followed by a pain in the head, which rendered her sight more confused. For the present, the use of electricity was therefore wholly omitted. Three leeches were applied to the right temple, and afterwards a blister of the size of half a crown to the same part. By these means the pain in a few days was removed. The electric air was then again applied, but no sparks. It was continued about ten days longer; at the end of which time she recovered the perfect use of the right eye: and this she preserved till the time of her death, which did not happen till several years after.

CASE II.

Mrs. R——, when about thirty years old, was suddenly attacked with a violent headach, accompanied with sickness, which continued, with little intermission or abatement, for the space of three days. After this long paroxysm

roxysm of severe pain, and probably from this cause, the sight of the left eye became impaired in so considerable a degree, that she was incapable of distinguishing any object, though placed immediately before her. At that time the right eye did not appear to be at all affected; and, during a few following days, she could see with it as perfectly as before. But soon after, the disorder extended to this eye also; and in eight days from the first seizure of the headach, she so far lost the sight of both eyes, as not to be able distinctly to perceive even the blaze issuing from a large fire. There still, however, remained some degree of a glimmering sight with the right eye, so as to make her sensible of the difference between night and day. But it was not long before she became totally dark in this eye as well as the other; and on the third day of her being so I was first consulted. On examination I found that her eyes were not at all inflamed, that both the pupils were considerably dilated, and that their size was unalterably the same, though acted upon by the brightest light. I immediately

passed

passed a strong steam of the electric fluid through both eyes, which was continued for about ten minutes. This, though powerful enough to be strongly felt when applied to the eye, and even to the hand, of other persons present, seemed to affect the patient only in a very small degree: and the application was renewed several days before she was sensible of the least amendment. In about a week from the time when the first trial was made, as she was returning home after being electrified, she perceived with her right eye some water collected in a gutter; and the same evening was able to distinguish the light of a candle. The pain in her head still continuing very violent, I then directed three leeches, and after them a blister, to be applied to each temple, with the use of gentle laxatives occasionally, as the state of the body required. The joint effect of these was not inconsiderable (though but partial and temporary) towards giving relief to the patient for the complaint in her head. But as only the right eye had yet recovered any sensibility, and that in a small degree, I then renewed the

electric

electric applications, placing the patient on the glass-footed stool, and taking small sparks from the integuments surrounding the eyes; at the same time continuing to pass the electric stream through the eyes themselves. At the end of three weeks the sight of the right eye was so much restored, that with it she could distinguish large letters. But the left eye during the whole of this time remained totally blind; and the patient was still afflicted with severe sensations of pain in her head, particularly on the left side. Having continued the electric applications near a fortnight longer, without making a visible advance in the cure, I was almost ready to despair of their rendering any further service. Yet, unwilling to give up the use of means which had already administered so much relief, I determined on a further trial; and accordingly persevered in the use of them some time longer. I was happy to find that this perseverance was not in vain: for one day, whilst I was taking electric sparks from the left eye, she suddenly exclaimed that she could now perceive a glimmering of light with this

this eye, as she had some time before done with the other; and this she imputed to the effect which the electric spark then had on a part of the eye which had not before been touched by it. The very next day a great number of objects became visible to this eye; and from that time there was a progressive daily amendment. Within a short space of time the sight of both eyes was perfectly restored; and as the sight returned, the sensations of pain in the head gradually abated, till they entirely ceased.

CASE III.

Mrs. S. in February 1784, when she was in her thirtieth year, was brought to bed; and being a woman of a healthy constitution, chose to suckle the child herself. This she did for some time without feeling any inconvenience from it; but, having continued it for six weeks, her strength began to fail, and continued to decline daily, till she became incapable even of moving about the house without experiencing a very

a very painful languor. About the same time her sight also was affected; first only in a small degree, but afterwards so considerably that the full glare of the mid-day sun appeared to her no stronger than the light of the moon. At this period of her disorder no black specks were visible before either eye, nor did objects at any time appear covered with a mist or cloud; but the patient being further afflicted with a violent pain in the neck, which ran in a direction upward to the side of the head, on that account the person who attended her thought proper to take four ounces of blood from the part first affected, by cupping. After this the sight of the patient was worse than before, and it was not long before she entirely lost the use of both eyes. She had been three days in this state of blindness, when my partner, Mr. Wathen [2], was first desired to see her. On examining the eyes, he found the pupils of both to be very much dilated, and to remain unaltered in the

[2] At the time this paper was read before the Medical Society, the partnership still subsisted between Mr. Wathen and the author.

brightest

brightest light. Mr.Wathen's first advice was, that the child should be weaned without loss of time; ordering, at the same time, bark draughts to be taken by the mother three times in the day. He also prescribed an opening medicine, to be taken occasionally, on account of a costive state of body, to which she had been almost constantly subject ever since the time of her delivery. To the use of these remedies was united the frequent application of the vapour of æther to the eyes and forehead. On the fourth day after this mode of treatment was adopted, I visited the patient with Mr. Wathen. From the account she gave of herself, her strength and spirits seemed to be in some degree on the return; and she could then perceive faint glimmerings of light, though the pupils of both eyes were in the same dilated and fixed state as before. The use of the bark and æther was still continued, and the following day a strong stream of the electric fluid was poured on the eyes, whilst several small electric sparks were also variously pointed about the forehead and temples. The day after this, to in-

crease the force of the electrical applications, as it was then thought advisable, the patient was placed on a glass-footed stool, that, being thus insulated, the experiments which had before been tried might be repeated with still greater effect. This process, there is every reason to think, had a considerable influence towards making a perfect cure. On the first attempt it was almost immediately followed with such a degree of amendment, that the patient, to whose sight every object had before been confused, could now clearly distinguish how many windows there were in the room where she sat, though she was still unable to make out the frames of any of them. On the third day, soon after she had been thus electrified, the menstrual discharge came on for the first time since she had been brought to bed, and continued three days. During that time it was thought proper to suspend the use both of the bark and electricity, which was accordingly done. But no sooner did the reason of the suspension cease, than the use of both was resumed: and the effect was every way to our wishes; for her

sight

sight now mended daily. At the end of a week she could perceive all large objects; and in a short time her sight was so much recovered that she could read even the smallest print. Her strength, indeed, did not return so quickly: on which account she was advised to remove from town into the country, where the change of air, with the help of a mild nutritious diet, soon restored her to perfect health in every respect.

CASE IV.

Mrs. ———, near forty-five years of age, was attacked with a violent pleuritic disorder. It continued several weeks; till at length her strength was so much reduced that she became even unable to turn herself in bed without assistance. But before this, and near a month after the commencement of the pleurisy, she was seized with a violent pain in the left eye, without any apparent inflammation, which she described as shooting upward to the top of her

head, and which was soon followed with a considerable dimness in her sight. The dimness continued increasing five days; at the end of which she entirely lost the use of this eye. In the space of three weeks afterwards, a violent pain, similar to that which she first complained of in the left eye, attacked the other also; and was accompanied with the like symptom of shooting upward to the top of the head. The sight of this eye, however, though considerably impaired, was not so rapidly lost as that of the other. The dimness was slower and more gradual in its progress; and, for two or three weeks after, she saw occasionally, or at least fancied she saw, a number of bright sparks, which seemed to dart suddenly across the eye. But in less than a month, what remained of the sight of this eye went off also. On the loss of her sight the pain immediately ceased. It is also to be observed in the case of this patient, that her spirits had often been much agitated by painful occurrences;—that for many years past she had been subject to frequent returns of rheumatic affections in different parts of the body;

body;—and that, in her late illness, she had tried the power of many medicines, in conjunction with bleeding by leeches on the temples, and the application of blisters both to the head and side. Besides these trials of medical skill, it was thought proper, during the latter part of her illness, that she should be removed into the country to take the benefit of change of air.—The result of all was that she recovered her strength: but the blindness still continued. In the left eye she had been blind five weeks, and in the right a fortnight, when I was first consulted. On a careful examination of the pupils of both eyes at this time, I found that, though they retained their usual transparency, they were much dilated, so as not to be in the least affected by any degree of light. My first attempt was with the vapour of vitriolic æther, which I directed her to apply several times in the day to both eyes. With this remedy was united the use of the Peruvian bark, two scruples of which in a glass of white wine were prescribed to be taken three times in the day. Besides which, once in that time, a strong stream of the electric fluid was

to

to have been applied to the eyes, and continued for about ten minutes or a quarter of an hour. But the person employed in the business of the electricity, being unacquainted with the mode of applying the stream, substituted for it, of his own accord, small electric shocks; to which he gave different directions through the head. She had been electrified only three times, and in this way, when her husband was taken ill, and in a few days died. This melancholy event prevented her from attending afterwards to have the electric applications repeated. It is, however, to be noticed, that it had been found not a little serviceable on every trial which had hitherto been made of it; and in particular, the last time she was electrified, that the operation was no sooner over than she instantly perceived a number of objects near her. The bark and æther were still continued as at first ordered; and in about two months the pupils returned to their natural size; and she recovered a sight sufficient to enable her to read common letters with the left eye, and to see all larger objects with the right.

REMARKS.

REMARKS.

As it will not, I presume, be doubted by any who are made acquainted with the cases above related, that they furnish direct and no inconsiderable proofs of the great use of electricity in the treatment of the Gutta Serena, I therefore beg leave to avail myself of the opportunity which these instances afford, to recommend the trial of this now too much neglected mode of practice, I mean electrical applications, under all similar complaints. It is but a few years ago when electricity was held in such high estimation as to be deemed a sovereign specific for the removal of almost all obstructions in the human frame. Accordingly, at that time, recourse was had to it in most disorders of this kind, where the more easy as well as common methods of cure did not speedily take effect. In consequence of its being then so generally practised, it is not to be wondered at, that many instances

instances occurred in which it failed of success. But this, I apprehend, has been often owing rather to an injudicious use of it, either in cases to which it was not adapted, or in the manner of using it, than to any want of efficacy in the nature of the remedy when properly applied, and where it was at all likely to be of service. It seems therefore to have been without any sufficient reason, notwithstanding all the discouragements with which it was attended in fact, and which were thought to make against it, that the practice of electricity has of late so much sunk in its reputation as to be almost wholly laid aside. The success I have met with in the use of it very much confirms me in the opinion I have always entertained, that under proper direction it may be rendered of considerable use. This opinion is grounded on the subtle and active nature of the electrical fluid, which of itself strongly points out the peculiar propriety of applying it in affections of the nervous system; and in which class of disorders it has been so often tried with the happiest effects: and in incipient cases of the

Gutta

Gutta Serena, of which, I am now led more directly to speak, I have known it, under the management of different professional men, as well as in the course of my own practice, to be followed with very remarkable success[3].

But, after all, considerable as the relief is which electricity has been found to afford in many instances of this disorder, yet it is not to be expected that this, any more than other remedies, should equally succeed in all such cases. It is always to be remembered that the causes of the disorder are various, some of which are, from their very nature, incapable of being removed. In proof of this, besides the instances which have occurred under my own inspection, many from authors might easily be

[3] An eminent physician of this city, who has paid particular attention to the effects produced by electricity in medical cases, informs me he has found its application more strikingly useful in cases of the Gutta Serena, when this disorder has been produced by lightning, than when it has proceeded from any other cause. He lately related to me two cases brought on in this way, in both of which electricity proved successful, and very speedily restored the patients to their perfect sight.

quoted;

quoted; but it may suffice, at present, to refer only to one, I mean Bonetus, who, in his Sepulchretum Anatomicum, lib. i. sect. 18, has given us several such cases; in four of which, after the decease of the patients, the real state or true cause of their disorders appeared to be as follows:—in one, the blindness was found to be occasioned by an encysted tumour weighing fourteen drachms, which was situated in the substance of the cerebrum, and pressed on the optic nerves near their origin:—in a second, by a cyst, containing a considerable quantity of water, and lodging itself on the optic nerves, at the part where they unite:—in a third, by a caries of the os frontis, occasioning an alteration in the figure of the optic foramina:—and, in a fourth, by mal-formation of the optic nerves themselves. Now in all these instances, and in others of the same kind which might be adduced, it must be evident that the causes of the disorder were such as lay beyond the power of art to reach[4].

But

[4] Maitre Jan had so formidable an idea of the Gutta Serena,

Bnt while, in the cases now referred to, those causes were ascertained on dissection, which could not be known while the patient was living, and which shewed the malady to be in itself altogether irremediable, it must not pass unnoticed, that others also have occurred, in which, upon opening the subject, and after the closest inspection, nothing was to be discovered, either in the structure of the eye, or in the state of any of the component parts contributing to the faculty of vision, which could at all obstruct the performance of their proper offices.

In these instances the failure or imperfection of sight was accounted for by supposing some defect in the optic nerves, though not discoverable, and which, however occasioned, disqualified them for conveying the impressions of objects through the eye to the brain: and this was thought to be the only solution which could be given of the difficulty.

Serena, on account of the causes from which he apprehended it to proceed, that he pronounced it to be, in every state of the disorder, and at all times, incapable of a cure. *Traité sur les Maladies de l'Œil*, p. 253.

I have

I have bestowed not a little attention on the cases of such subjects as those last described, and am led, by reflecting on them, to hazard a conjecture as to one cause, which, at the same time that it seems fully equal to the production of every apparent effect in the disorder now under consideration, does yet make so very little difference in the appearance of the parts affected from what they commonly have after death, that the alteration may easily escape the notice even of those who have acquired no small skill in anatomical investigations.—The cause I mean, is a dilatation of the anterior portion of the circulus arteriosus; which, I think highly probable, has been the cause of the Gutta Serena, in not a few of the instances of which no particular account has been given; and especially in those cases where the blindness has been accompanied with an inability of moving the upper eyelid. In the appendix to my remarks on the Ophthalmy, the first edition of which was published in the year 1780, I inserted a case of this last kind which received a perfect cure; and since that time I have met with several

several similar instances.—But here some explanation may be necessary.

By the term *circulus arteriosus*, anatomists understand an arterial circle surrounding the sella turcica, which is formed by the carotid arteries on each side, by branches passing from them to meet each other before, and by other branches passing backward to meet branches from the basilary artery behind.

My meaning will perhaps be better understood by the following fuller description. At but a little distance from the points where the carotid arteries enter the cranium through the petrose canals which open by the side of the sella turcica, each artery sends off a branch passing in a straight direction forward till it has reached a little beyond the part where the optic nerves unite, whence it proceeds in a direction inclining towards a branch from the opposite artery, which it usually joins, and with it forms the anterior portion of the circulus arteriosus. It is to this portion of the circulus arteriosus to which I here principally refer; and concerning which it is very material to be noticed, that its situation

situation is directly over the optic nerves, which it crosses, lying in close contact with them. Very near to these first branches issuing from the carotid arteries is a second set, I mean one on each side, taking their direction backward, for the purpose of meeting other branches from the basilary artery, with which it is also usual for them to unite; thus forming the posterior part, and completing the whole of the circulus arteriosus. It is yet further to be observed, that exactly in the same manner as the anterior branches of the carotid arteries cross the optic nerves and lie in close contact with them, so the posterior branches of this artery cross and lie in contact with the nervi motores oculorum. Now, as it is well known that all the arteries of the human frame are, from their texture, liable to no small variations both from contraction and dilatation, should a more than common degree of the latter at any time happen to take place with respect to both, or either of those portions of the circulus arteriosus which I have been describing, it must then be plain to every one who is at all conversant with the subject,

that the nerves severally connected with these parts will, in proportion to the degree in which they are dilated, suffer by compression from them. The dilatation of an artery being, however, not always equal in every part, it is evident that the compression, which is the effect of it, must, as to its extent, be determined by that of the former, which is its proper cause. Should then the dilatation take place in the posterior portion of the circulus arteriosus, so as to compress the nervi motores oculorum, the consequence will be, that the eyelids, and probably the eyes also, will lose the power of motion. But if the dilatation happens in the anterior portion of the circulus, as the compression will then be on the optic nerves, the sight must of course be destroyed. And should the dilatation take place in both portions so as to occasion a compression both on the optic nerves and the nervi motores oculorum at the same time, while the eyelids will hereby be rendered immoveable, the eyes also will be deprived of sight and motion together. For aught we can pronounce, but a small degree of pressure on such tender

and

and exquisitely sensible parts as those we are speaking of, may produce all these dire effects. But, however that may be, it seems not a little to favour the opinion now advanced, that most of the persons I have seen who have been attacked with the united symptoms of blindness and falling of the upper lid, have been, like the girl whose case is above referred to (p. 428), both young and plethoric; and such subjects appear much more likely to suffer from an undue dilatation of the blood-vessels than those of a different habit. I am further informed by surgeons who have resided in hot climates, that persons, after much fatigue, when the blood is likely to be most rarefied, and the vessels through which it passes of consequence most dilated, have not unfrequently in such a state of body been attacked with sudden blindness, without any apparent defect or disorder in the eyes; and that the cure of such patients has generally been accomplished in a short time by bleeding, blistering, purging, and the application of volatile remedies to the eyes: in which instances, as well as in the former, it seems not a little probable

probable that the blindness was occasioned, in the first instance, by a dilatation of the blood-vessels within the cranium[s].

Besides the blood-vessels of which I have been speaking, there is another, not yet noticed, the dilatation of which may also essentially affect the sight: I mean that vessel, the course of which lies directly through the centre of the optic nerve to the retina;—a branch of which also passes through the vitreous humour, to the capsule of the crystalline lens. The dilatation of this vessel I have often suspected might be the cause of blindness in those instances where

[s] Dr. Baillie, in his Morbid Anatomy of the Human Body, printed for Johnson, 1793, introduces the following observation:—

"It is very common, in examining the brain of persons "who are considerably advanced in life, to find the trunks "of the internal carotid arteries upon the side of the sella "turcica very much diseased, and this disease extends fre-"quently more or less into the small branches. The dis-"ease consists in a bony or earthy matter being deposited "in the coats of the arteries, by which they lose a part of "their contractile and distensile powers, as well as of their "tenacity. The same sort of diseased structure is likewise "found in the basilary artery and its branches." Page 308.

it has come on suddenly, and in which, though all objects placed directly before the eyes were totally invisible, there has nevertheless remained some small sense of light, so as to give a confused perception of objects sidewise. In such cases, it is to be noticed, that the pupils are seldom much dilated; notwithstanding which, they admit of very little variation of size in different degrees of light.

A dilated pupil is considered by most authors as a symptom peculiarly characteristic of a Gutta Serena; and I have observed it to be a common attendant in most of those cases in which electricity has been found serviceable. Many other instances of blindness are, however, continually occurring, in which, instead of a dilatation, a contraction of the pupil is the only change which takes place in the appearance of the eye. In cases of the latter description, the obstruction in the sight is usually preceded by severe pain: and the original cause of these several effects may be an internal ophthalmy, if prevalent in any considerable degree: and they are not unfrequently accompanied

with visible opacity in the crystalline capsule. In cases thus circumstanced, electricity, administered in different ways, has also sometimes been of advantage. But there is a medicine which in many instances has proved it superior as well as of more certain efficacy, and which I must therefore greatly prefer to all external applications whatever. The medicine I am speaking of is the corrosive sublimate, which, in the new London Pharmacopœia is called hydrargyrus muriatus. Of this I would recommend a quarter of a grain as a quantity proper for a common dose; which I have found to agree best with the stomach, when first dissolved, as Van Swieten directs, in half an ounce of brandy, and then taken in a bason of sago or water-gruel. For young patients, some abatement must be made in the quantity of the dose according to their age, and it should be continued, with as few intermissions as the constitution will admit, for a month or six weeks, and even longer, if found necessary.

I must also add here, that in several instances of the common Gutta Serena, I have lately

known considerable relief to be obtained by the use of a snuff compounded of ten grains of turbeth mineral (in the new Pharmacopœia called hydrargyrus vitriolatus) well mixed with about a dram of the pulvis sternutatorius; or, in place of that, the glycirrhiza, or saccharum commune. A small pinch of this snuff taken up the nose is found to stimulate it very considerably; sometimes exciting sneezing, but in general producing a very large discharge of mucus. It will hardly admit of a doubt, that the benefit derived to the patient from the use of this snuff chiefly depends on its immediate effects, which have been just pointed out: though, at the same time, it is not improbable that some particles of the mercurial preparation, which enters into the composition of this snuff, may make their way to the minuter vessels connected with the part affected, their action on which may also not a little contribute to its efficacy. Applications of the kind last mentioned in cases of the Gutta Serena have the concurrent testimony of many authors both ancient and modern; and some of them speak of the

chief

chief ingredient in the snuff above described, which is turbeth mineral, as particularly adapted to give relief in cases of this nature. Mr. Boyle, in his works[6], relates a case in which this one ingredient was singly administered in its full strength by an empiric at Paris, and was attended with astonishing success. It is, however, to be noticed, that in this instance it operated most violently in the several ways of vomiting, purging, sweating, salivating, and also caused the head to swell to a very large size. I have been a witness to the efficacy of the same application in several instances, in which, being given in its compounded state, the turbeth mineral was so far covered, or its potency reduced, that it was followed with no such violent effects as in the case related by Mr. Boyle. Of these instances of its success, the four following are so remarkable and satisfactory, that I shall relate the cases at some length.

[6] Boyle's works abridged, vol. i. p. 103.

CASE

CASE V.

W. W. a shipwright in the King's Yard at Woolwich, about forty-six years of age, in the year 1784, received a violent blow on the right eye, which it instantly deprived of sight. A very considerable inflammation ensued, which was soon followed by a similar disorder in the other eye. The inflammation in the left eye went off in a short time, without leaving any perceptible bad effects; but that in the right eye continued, and was attended with extreme pain, many weeks; and when at length it abated, the eye still remained totally blind. The sight of the left eye continued perfect until nearly three years had elapsed after the accident above mentioned. It was then attacked with a dimness which slowly but uninterruptedly increased, until, in about twelve months from its commencement, this eye, as well as the other, became so blind that the patient could scarcely distinguish the difference between day and night.

night. In this melancholy state he remained eighteen months; at the end of which I was consulted by him for the first time. I found, on examination, that the pupil of the left eye was much dilated, and its size unalterable in the brightest light. It was also clouded with a slight opacity; but this, when considered alone, was insufficient to account for the patient's total blindness. The pupil of the right eye was contracted almost to a point, and this point was compleatly opaque, and turned upwards from its central position, so as nearly to touch the outer margin of the cornea. From the inspection of the case, together with the account I received of its progress, it seemed evident that there was no possibility of recovering the sight of the right eye; and the blindness had continued so long in the left eye, and the disorder so exactly answered to the idea we usually entertain of a fixed Gutta Serena, that I gave the patient no encouragement to expect any relief. Being desirous, however, to try the effects of a mercurial snuff, compounded in the proportion of one part of turbith mineral with five of liquorice

liquorice powder, I prescribed it for him, and recommended him to take a pinch of it every night before he went to bed. After this consultation I heard nothing more from him for about six weeks. He then called on me again, and gave me the following satisfactory information. The first three times he used the snuff it made his nose bleed for about ten minutes. After this the hæmorrhage did not return any more, but each time the snuff was taken, it occasioned the discharge of a considerable quantity of mucus. He had taken the snuff only eight days before he perceived with his left eye the motion of his fingers; and in eight more could distinguish them one from another, and also some large chalk marks which were drawn on a dark-coloured door. His sight after this became daily more clear, until at the time I saw him, he was able to walk, without any assistance, from his dwelling-house in the the town to his work in the yard, and when there, to employ himself in many different parts of the business of ship-building.

CASE

CASE VI.

Mrs. B. a corpulent but healthy woman, about twenty-eight years of age, received a considerable cut on the fore finger of the right hand from a butcher's cleaver, which, as might be expected, was followed with a profuse bleeding. In consequence of the fright and pain which this accident occasioned, she fainted, and continued in that state almost an hour. When she came to herself she had still a very severe sensation of pain, which in a few days caused an inflammation over the whole hand, and threw her into a high fever. At that time her head ached violently; her eyes, though not inflamed, were the seat of much pain; and the sight of them so much impaired, as to make both the patient and her friends very apprehensive on that account. The surgeon who was first called in was then of opinion that the dimness of sight, so much complained of, was nothing more than an effect of the fever, the reduction of which was therefore the first object of his attention. With this view he prescribed

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the usual febrifuge draughts; at the same time not neglecting those outward applications which he judged proper for the inflamed hand and finger. But this method of treating the case, however likely to succeed, was in fact found to give no relief either for the complaint of the head or eyes; the pain in the one, and the dimness of the other, continuing the same, without the smallest abatement. When she had continued in this state for a week, the further advice of a physician was required; who, besides the use of other internal remedies, thought it material that she should be blooded with leeches applied to the temples. Accordingly, as soon as they could be procured, three were applied on each side. This bleeding seemed to do more for her relief, as to the pain of the head, than all that had been prescribed before; for, from that time, her head became much easier; nor was she afflicted with the same pain, at least to any degree of violence, during her confinement. At present, however, she was far from being benefited in her sight by any thing which has been done. For the remainder

mainder of the day in which the leeches were used, her dimness continued much the same; and though she slept well that night, yet, to her great astonishment, when she awoke the next morning, she found that her sight, instead of being merely dim, was now totally lost. This then was the complaint to which the attention of the faculty was now confined; remedies having been found for the previous and concomitant ones, which had accordingly subsided. In the course of the two following months, various attempts were made for the recovery of the patient's sight, by the use of means, some more, and others less common; but which, whatever success they might have been attended with in other similar cases, were found in the present insufficient to give any lasting relief. Once, indeed, during these applications she thought she perceived a picture which hung against the wainscot at about the distance of seven feet from her. This, however, whether real or imaginary, was little more than a momentary impression; for, neither at that time, nor at any other, was she able even to distinguish so much

much as the light of the window. Among other methods of cure which were made use of, she had been three times electrified by Mr. Lowndes, in St. Paul's Church-yard; who, as desired, applied the electric wind to both eyes, and drew small sparks from the temples, and integuments surrounding the orbit. But, slight as these electrical applications were, yet so extreme was her constitutional timidity, that she was not to be prevailed on to submit to a repetition of them. Whatever hopes, therefore, might have been entertained of success from this quarter, they of course were now given up. On account of a violent pain in the side, she was blooded, and blistered on the back: which I pass without further notice than to say, that though they succeeded in removing the complaint to which they were immediately directed, still the blindness remained, and seemed as fixed as ever. On the 28th of November, 1787, my partner, Mr. Wathen, first saw her. He found the eyes at that time to be wholly insensible of light, and the pupils widely dilated. From the view he took of the case, he saw no

ground

ground of hope for a cure:—still, however, as it was incumbent on him to try whether any thing could be effected, he prescribed the application of a large blister to the head;—a pill containing one-eighth part of a grain of corrosive sublimate to be given her twice in the day;—and a small pinch of snuff, compounded of two grains of turbith mineral with a scruple of the pulvis sternutatorius, to be taken frequently. On the 5th of December I attended the patient. On that day she described some appearance like that of the tables and chairs in the room, which she fancied was before the right eye; but she saw no object with a degree of clearness to make her certain what it was. She was under this uncertainty even as to the light of a candle; nor could she be sure of any difference between day and night. On inquiry I found that the pills and snuff had been regularly taken as prescribed; but that the blister for the head, which had also been ordered, was not yet applied. The effect of the snuff, a pinch of which she took three or four times every day, was to excite violent fits of sneezing, which

were

CASE VII.[8]

A lady of a very delicate constitution, about thirty years of age, was attacked, in November, 1791, with a violent pain in her head, attended with an uncommon sensation of weight in the back part of it. The pain, which was supposed at first to be rheumatic, varied much in degree at different times, and sometimes, for short pe-

tory, and has found it of distinguished use in many disorders both of the eye and ear. He recommends to mix it with sugar, and in the proportion of one part of the former with three of the latter. In order to be more exact in the use of this remedy, I have lately accustomed myself to prescribe one grain of the turbith mineral to be mixed with twenty grains of powder of liquorice, of snuff, or sugar; and one fourth part of this powder to be snuffed up the nose once or twice in the course of the day. And in those cases where the nose has been particularly dry, I have rendered the powder more effectual, by directing the patient to inhale the steam of warm water through the nose previous to the use of the snuff.

[8] The following case occurred since the time that the preceding part of the paper was read before the Medical Society.

riods, it wholly went off; but after intermitting in this irregular way about three weeks, it at length became constant, and was attended with other pains of a similar kind in both her shoulders. The head-ach was so violent, accompanied with such strong throbbings in both ears, that she had much difficulty to keep her head still on her pillow; and these were soon followed by so great a degree of general debility, that she could scarcely move either her hands or feet. In the progress of every day she had several fainting fits, and in some of these she continued a quarter of an hour before she could be roused from them. Previous to my being consulted, she had been attended by an able physician and apothecary; by whose care of her the fainting-fits were removed, and her strength somewhat increased; but the pain in the head continued, and for the last fortnight her sight had gradually failed, objects appearing not only confused, as if they were covered with white crape, but much larger than their natural size; and at length, both eyes became totally blind. On examination, I found that they

were free from inflammation; but the pupils, though clear, were much dilated, and their size did not vary at all in different degrees of light. December the 27th, it was agreed in consultation with the gentlemen who had before attended her, to administer a light preparation of the cortex Peruvianus, three or four times in the course of the day; to apply the vapour of æther to the eyes twice or thrice during the same period; and to give her a sternutatory powder, composed of a quarter of a grain of hydrargyrus vitriolatus, and two grains of common snuff, every night. December the 31st, she continued nearly in the same state in which she was on the 27th. The snuff had excited a copious discharge of mucus from the nose every time it was used. The same remedies were again prescribed, and in addition to these she was desired to chew the radix pyrethri, and to have the electric aura applied to her eyes ten minutes every day. The radix pyrethri occasioned a very considerable discharge of saliva every time it was used; and, after a few days, small electric sparks, as well as the electric aura,

aura, were applied to the eyelids, and the other integuments that surround the eye. January the 8th, the pain in the head was much abated, and the lady perceived the hand of a servant who waited on her. The following day she distinguished several large objects. January the 12th, the menses were expected, but did not appear. Her eyelids felt heavier than they had done for many previous days, and her sight was much more dull and confused. An emmenagogue medicine was prercribed, and her feet were put into warm water at bed time, but these did not produce any sensibly good effects. On the 15th, however, the sight began again to mend, and she distinguished the shape of a salt-spoon. For a few days before she became totally blind, all objects had appeared magnified; but now, on the contrary, every thing seemed smaller than its real size. After this time, both her sight and her strength mended steadily but slowly. The same remedies were still continued; and in about a month from the time I first saw her, she read a common sized print with tolerable facility. When the proper period for the

appearance of the menses again came round, this evacuation took place, but it was much less in quantity, and continued a much shorter time than it usually had done when the patient was in a state of health. Several months elapsed before she was quite regular in this respect. The sight of both eyes, however, mended daily, and at length returned to its usual degree of perfection.

CASE VIII.

The following case, by Mr. R. B. Blagden, surgeon at Petworth, in Sussex, was published in the fourth volume of Medical Facts, and Observations, printed for Johnson, 1793. Mr. Blagden permits me to introduce it here; and it tends to corroborate the opinion above advanced, of the efficacy of a mercurial snuff in many cases of the Gutta Serena.

"Mr. ————, aged thirty-one years, of a "spare habit, and subject to scrophulous affec- "tions of the submaxillary glands, between "four and five years ago, on a sudden, and "without

" without the smallest injury or previous indis-
" position, became sensible of such a defect in
" the sight of the right eye, that he was unable
" to take his favourite diversion of shooting, in
" the usual way: however, as the sight of the
" left eye enabled him to read, and to use a left
" handed gun pretty successfully, he was con-
" tented; and probably would have remained
" so, had not that likewise begun to fail:—a
" circumstance, of which he first took notice
" about six weeks before he applied to me.

" On the 7th of October, when I first saw
" him, the pupils of both eyes were contracted
" to as great a degree as the pupil of a sound
" eye is by a sudden and strong light.

" The pupil of the left eye, on the approach
" of a very vivid light, shewed so small an al-
" teration as to be scarcely perceivable; and
" that of the right none at all. With the left
" the patient could barely see the capital letters
" which the printers call the Four-Lines-Pica;
[Letters of four times the magnitude of the types of this book.] " with the right he
" could only distinguish light from darkness.

" The

"The case seemed to me a fair one for a "trial of the mercurial snuff recommended, "and so successfully used, by Mr. Ware, in the "third volume of the Memoirs of the London "Medical Society; and I accordingly directed "the patient to take a pinch of it, (prepared "by mixing five grains of the hydrargyrus vi-"triolatus, with thirty-five of the pulvis asari "compositus) every night. As he smiled at "the idea of being cured by a pinch of snuff, "I gave him two tea-spoonfuls of a mixture "composed of equal parts of tincture of vale-"rian, and compound tincture of lavender, "twice a day in a cup of rosemary tea: the "dose was afterwards increased to three tea-"spoonfuls.

"On the 21st of October the patient could "see the capital letters with the right eye, and "could read the Four-Lines-Pica print with "the left.—The pupils were in their general "appearance less contracted; and they were "affected more sensibly by the impression of "light. The first five or six times of using "the snuff it made his nose bleed freely, and

"so

" so long as it produced this effect, he thought " he perceived the advances more strikingly; " an additional two grains and a half of the " mercurial were therefore put to the next " quantity of the pulv. asari. c. and the hæmor- " rhage from the nose was reproduced as often " as it was made use of.

" On the 28th of October, the appearance " and contraction of the pupils were natural; " the patient could read a newspaper, and was " able to shoot correctly with his right handed " gun.

" On the 18th of November, the sight of " both eyes was in every respect perfect."

CASE IX.

Mrs. B. about thirty-five years of age, applied to me in the year 1798, on account of an inability to raise the left upper eye-lid; which came first after a severe fit of the rheumatism. There was not any appearance of inflammation, nor was the pupil dilated; but the sight

sight was dim, and occasionally the patient experienced considerable pain in the eye that was affected, which extended to the whole of that side of the head. She was a thin woman; her pulse was weak; and her general look conveyed the idea of debility. The electric air, with small electric sparks, had been applied to her eye for five or six minutes daily for some weeks; her eyelids had been embrocated with camphorated spirits; and chalybeate draughts had been given internally; —but these remedies had not afforded any relief. She had been married several years, but had never been pregnant; and I was informed by her apothecary, that shortly after her marriage, she had had an eruption on her skin of a very doubtful nature, on account of which she had undergone a regular course of mercurial medicines, which had completely removed it. In consequence of this information, notwithstanding, at the time I was consulted, there were not any appearances of a syphillitic nature, I thought it not improbable that some change might have been wrought on the constitution, either by the disease above mentioned, or by the remedies administered for its

cure,

cure, which contributed to produce the present disorder. With a particular view to this circumstance, I advised her to take half a dram of the powder of sarsaparil twice in the day, and to drink after it, each time, half a pint of the decoction of this root. I applied a thin slip of sticking plaister to the eyelid, and continued it longitudinally over the forehead, in such a way that it might give the lid a gentle support; and being informed by the patient, that a rheumatic pain in her neck had been relieved by the use of electricity, I advised it to be continued in the form of the aura, but not of sparks. At the end of a week from this time, as she had not acquired any additional power to raise the lid, and her pulse was increased in strength, I was induced to open the vein that passes by the side of the nose; and, took from it six ounces of blood. A gently purgative medicine was given, on account of costiveness, and afterwards she was directed to continue the sarsaparil, both in powder and decoction, as before. On a further trial of electricity, it became evident that it was not suited to the present state of the patient, since,

since, after its application, the uneasiness of the eye was each time increased, and the pain sometimes continued a great part of the day. She was, on the contrary, so decidedly relieved by the evacuations above mentioned, both in respect of ease and of power to raise the lid, that two days afterwards, I directed three leeches to be applied on the hollow part of the left temple. These afforded still further assistance. They were re-applied after three days more; and the amendment they afforded being again evident, the same number were repeated every three or four days for a fortnight; after which, without any further change in the treatment, the lid recovered its full power, the sight became clear, and both the eye and the head were perfectly freed from pain.

CASE X.

A plethoric young man applied to me in November, 1799, on account of a total blindness of the left eye, which had come on suddenly

denly about three days before I saw him. It was accompanied with a paralysis of the upper eyelid, a very considerable enlargement of the anterior chamber of the aqueous humour, and a great dilatation of the pupil. I immediately opened the vein that passes on the side of the nose, which, in this instance, was very large and perceptible, and took from it eight ounces of blood; after which I directed him to take immediately a brisk mercurial purge, and to foment his eye three or four times in the day with an infusion of rosemary and elder flowers in hot water; to which was added, at each time it was applied, one-third part of brandy. On the third day after this mode of treatment was begun, his eyelid seemed to have acquired strength, but the pupil remained much dilated, and the eye was still deprived of sight. Five leeches were now applied on the left temple, and the fomentation was continued as before. On the sixth day, the eyelid had acquired an increase of power, and the pupil was not quite so large. The same number of leeches were again applied, and the mercurial purge was repeated

peated as before. After this, two scruples of the powder of valerian, mixed with an equal quantity of soluble tartar, were given him morning and evening. The leeches were applied four times in the course of a fortnight; at the end of which time the levator muscle of the upper eye-lid had recovered its power; the pupil, as well as the anterior chamber of the aqueous humour, had returned to their natural size; and the eye had perfectly regained the power of vision.

CASE XI.

Mr. T. a merchant, about thirty years of age, having experienced much anxiety in the month of October, 1796, began to perceive a defect of sight in his left eye. The sight of the right eye, however, continuing good, he paid but little attention to the defect in the left eye for a month; but at the end of this time the sight of the right eye becoming also affected, he was advised by his apothecary to take my advice respecting

specting it. On an examination, I found that the pupil of the eye which was last attacked was very considerably dilated, the pupil of the other eye being also increased in size, but not to so great a degree; and both of them having wholly lost the power of contracting, though exposed to a strong degree of light. The levator palpebræ superioris muscle of the right eye had lost much of its power; the lid, without the assistance of the finger, was raised with great difficulty sufficiently high to afford me a sight of the pupil; and when the eye was open, all objects appeared to the patient confused and double. He was a weakly man, and had been often subject to indispositions, which proceeded from indigestion. In order to obviate any cause of the present malady, that might exist in the stomach, I desired him to take an antimonial emetic. This medicine brought from the stomach nothing more than its usual contents; but afterwards the patient's sight was improved, and the strength of the right eyelid was somewhat increased. After this, his pulse being weak and quick, I prescribed for him a draught, composed

him the myrrh and steel as before. Instead also of employing the spiritus salis volatilis, I now directed the vapour of æther to be applied to the eye; and morning and evening I desired him to wash his eyes freely with cold water, brought each time fresh from the spring. Under the use of these remedies, which were continued a month, the sight of both his eyes became again perfect; but the patient remarked that the eyelids were always heavy, and the sight dull, when the weather was wet or foggy; and, on the contrary, the eyelids were light, and the sight clear, when easterly winds prevailed, and the air was cold and dry.

CASE XII.

A young lady, about twenty years of age, was brought to town from the neighbourhood of Hungerford, to consult me on account of a total blindness of the right eye, which had continued six weeks, and was supposed to have been occasioned by a fall from her horse. Previous

to

to the accident, she had been long subject to a spasmodic affection, which made her breathe with difficulty on every slight exertion; and occasionally she had had a small hæmorrhage from her lungs, her menstruation having never been regular either in time or quantity. Her restlessness during the night was so great, that, in order to remove it, she had been obliged to have recourse to laudanum in large doses; and she rarely went to bed without taking at least a hundred drops of this medicine. On the first examination I was not sensible of any difference between the appearance of the right eye, which was blind, and that of the left eye, which possessed the power of sight; but on shutting the left eye, the pupil of the right eye became immediately enlarged; and it did not contract again, though exposed to a great increase of light, until the other eye was opened; when both of them became of the same size, and dilated and contracted together. The right eye at this time had a continual uneasy sensation, which it is difficult to describe, and was ac-

companied with a dull pain in the whole of that side of the head. I advised the immediate application of three leeches to the right temple, and a laxative draught to be given, on account of a costive state of her bowels. On the following day the head was somewhat relieved, but the blindness of the eye was the same as before. I now prescribed a quarter of a grain of the hydrargyrus vitriolatus to be mixed with four grains of sugar, and to be snuffed up the nose, as a sternutatory, morning and evening; and on account of the pain in the eye, I applied to it a drop of the thebaic tincture. The eye was also occasionally washed with a neutralized solution of the hydrargyrus muriatus in lime water. After three days the leeches were again applied to the right temple, and afforded the patient still further relief. The mercurial snuff acted powerfully on the nose, exciting both a considerable discharge of mucus and repeated fits of sneezing. When ten days had elapsed, during which time the leeches had been applied three different times, the right eye became sensible

sible of the light. The leeches were again applied; and, on account of her irregular menstruation, I prescribed for her a draught composed of powder of gum myrrh with five grains of kali, and two and a half of the ferrum vitriolatum, which was to be taken three times in the twenty-four hours. It had been taken, however, only one day, before she felt herself heated by it, and, in a fit of coughing, brought up some blood, which appeared to come from the lungs. The chalybeate draughts were therefore omitted; saline draughts, with the addition of a small portion of the tinctura castorei and tinctura valerianæ volatilis, were substituted in their place, and three leeches were again applied to the right temple. The hæmorrhage did not return after this alteration; the leeches were applied twice more in the course of the next ten days; the mercurial snuff was continued; and in about five weeks from the time of her coming to London, the sight of the right eye, which had gradually improved, was become nearly as perfect as that of

the other eye; the pain both in the head and eye was wholly removed; and the spasmodic affection of the lungs was so much diminished, that she could take moderate exercise without suffering any inconvenience from it.

THE END.

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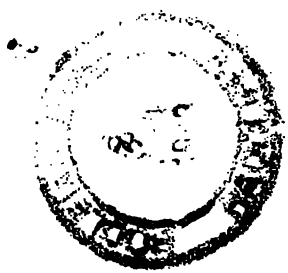

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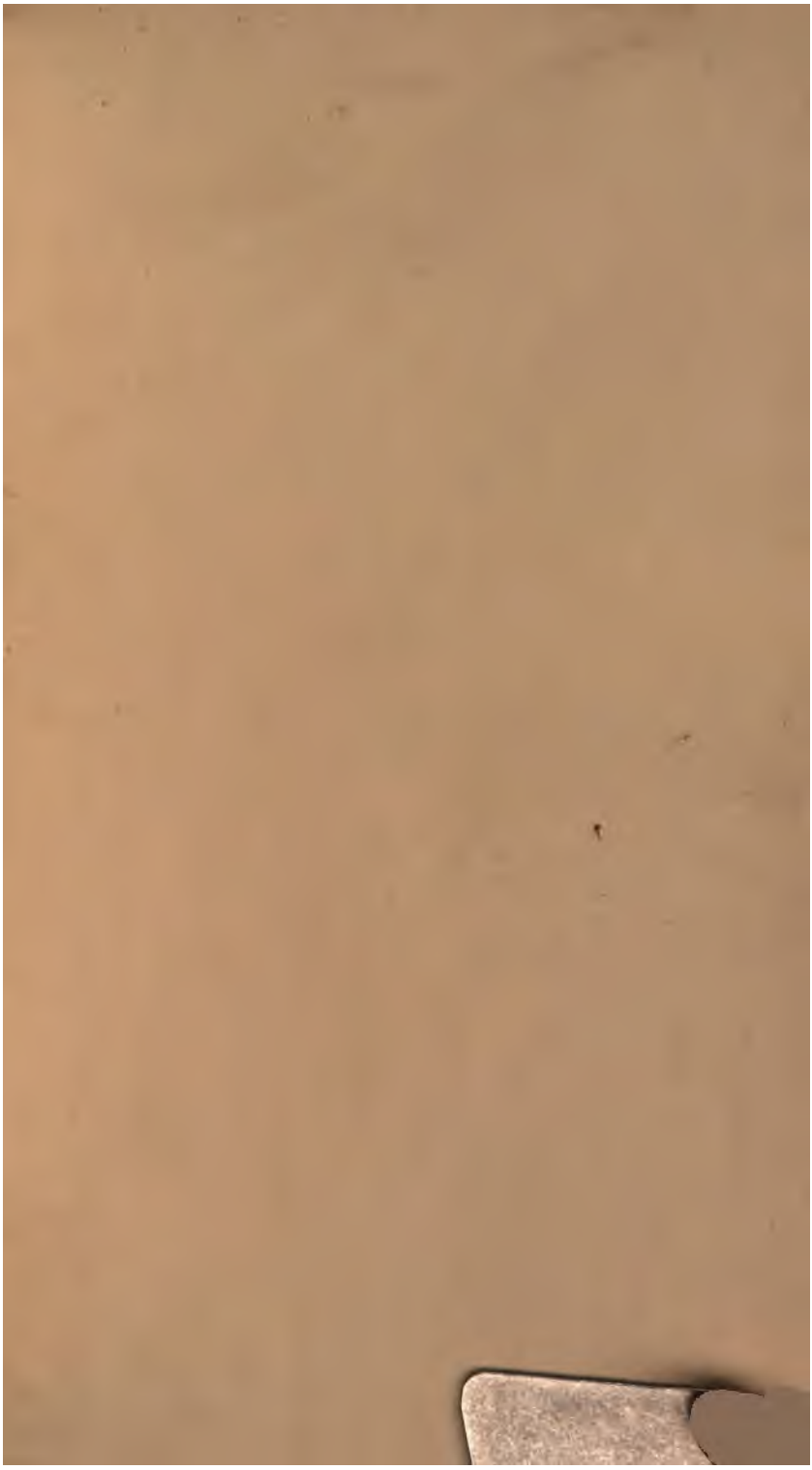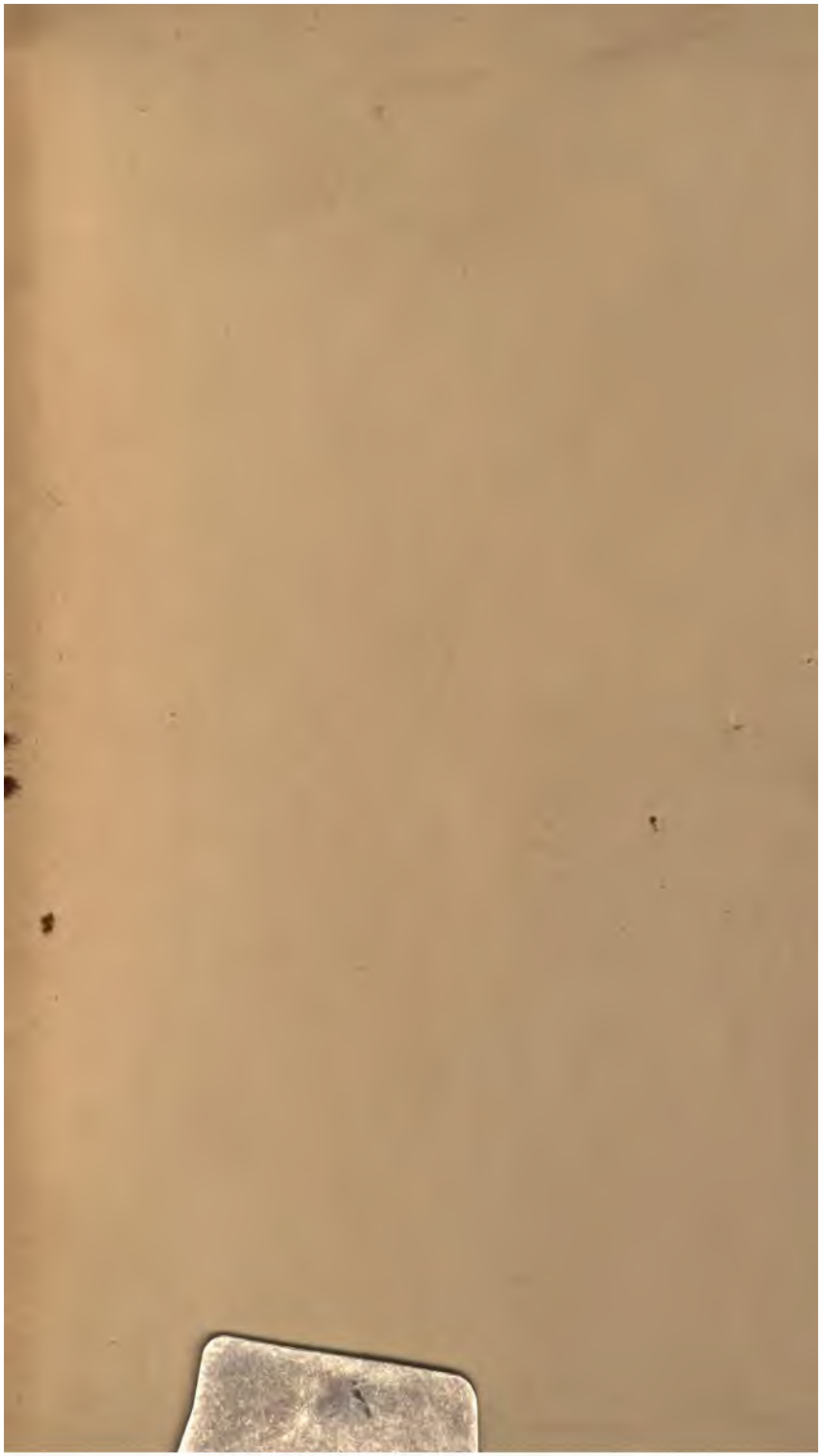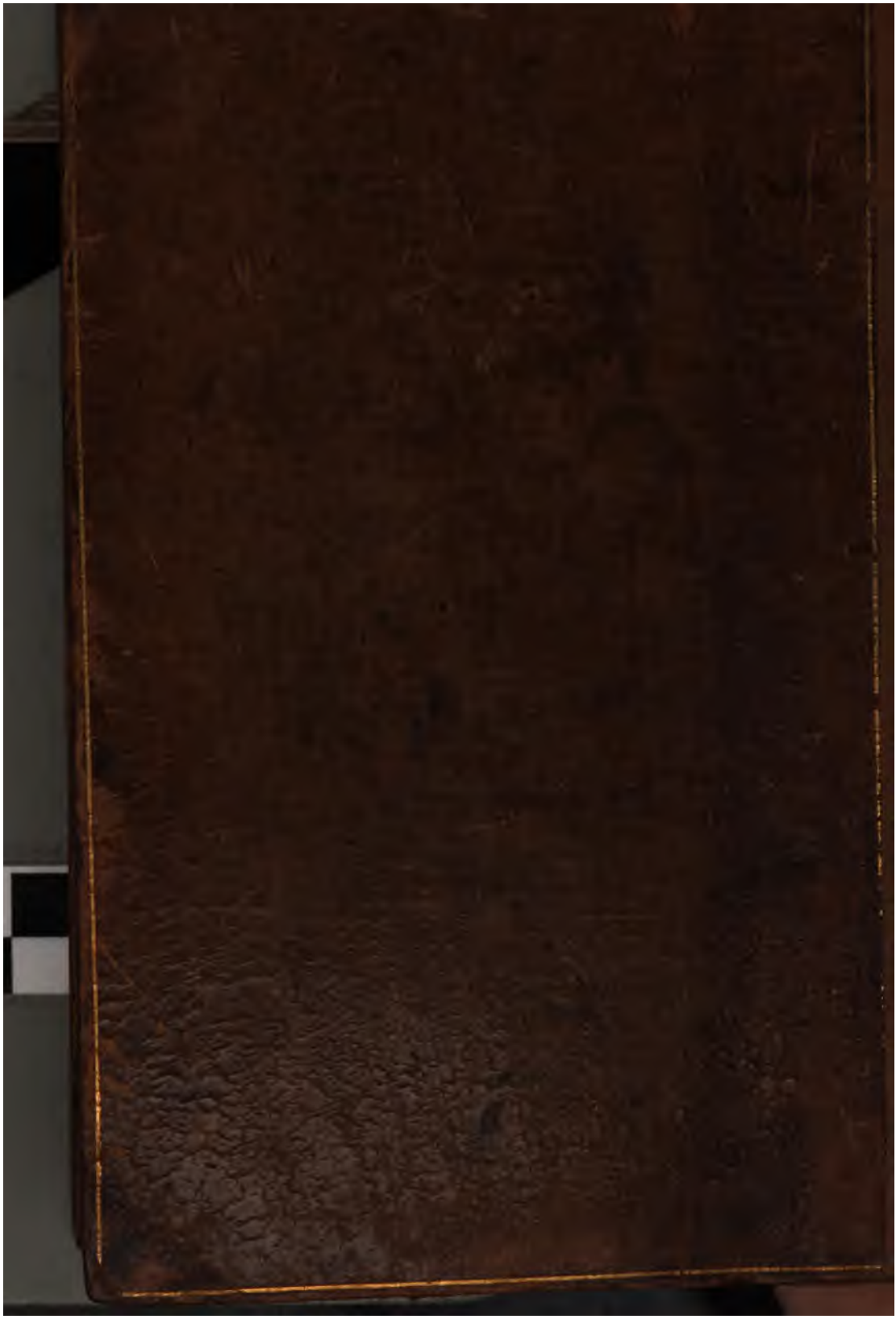
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